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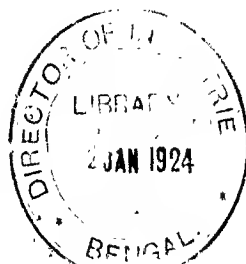
THE PREPARATION OF
PERFUMES AND COSMETICS

THE PREPARATION OF PERFUMES AND COSMETICS

BY
J.-P. DURVELLE

TRANSLATED FROM THE FOURTH FRENCH EDITION BY
ERNEST J. PARRY, B.Sc., F.I.C., F.C.S.

WITH TWELVE ILLUSTRATIONS



LONDON
SCOTT, GREENWOOD & SON
"THE OIL & COLOUR TRADES JOURNAL" OFFICES
8 BROADWAY, LUDGATE, E.C. 4

1923

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PRINTED IN GREAT BRITAIN BY RICHARD CLAY & SONS, LIMITED,
BUNGAY, SUFFOLK.

TRANSLATOR'S PREFACE

THIS well-known work of M. Durville was originally published in two editions under the name *Nouveau Guide du Parfumeur*. In its third and fourth editions—this translation being of the fourth edition—its title has been altered to *Nouveau Formulaire des Parfums et des Cosmétiques*.

The work has met with considerable appreciation and success in France, and I trust that an equal measure of success will be achieved by the work in its English form.

I have endeavoured to reproduce the author's work as faithfully as possible, and have taken no unnecessary liberties with the text, translating freely only in those cases where the reproduction of the author's meaning compels and justifies it.

ERNEST J. PARRY.

56a Great Dover Street,
London, S.E. 1.
August, 1923.

THE
INTERNAL-COMBUSTION
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CONTENTS

PART I

RAW MATERIALS

CHAPTER I

NATURAL RAW MATERIALS USED IN PERFUMERY

	PAGE
Water—Alcohol—Fatty Bodies—Liquid Fats and Oils—Solid and Semi-solid Fats—Essential Oils and Perfumes—Various substances frequently used in Perfumery—Colouring Materials	1 45

CHAPTER II

SYNTHETIC PERFUMES

Present Condition and Future—Description of Synthetic Perfumes: (1) Isolated Aromatics, (2) Synthetic and Artificial Products	46-87
---	-------

PART II

THE MANUFACTURE OF PERFUMED PRODUCTS

CHAPTER III

THE PREPARATION OF AROMATIC WATERS, EXTRACTS, INFUSIONS, AND TINCTURES

Aromatic Waters—Perfumed Spirits—Preparation of Raw Materials—Formulae for Simple Extracts—Formulae for Perfumed Spirits—Absolute Concretes and Liquid Essences for Preparing Infusions—by Solution in Alcohol—Tinctures of Synthetic Perfumes—Filtration	88 121
---	--------

CHAPTER IV

COMPOUND EXTRACTS KNOWN AS BOUQUETS—PERFUMES FOR THE HANDKERCHIEF—PERFUMED WATERS

Fixatives—Formulae for the Preparation of Perfumes for the Handkerchief—Formulae for Triple Extracts (best quality)—Formulae for Double Extracts (best quality)—Manufacture of Extracts No. 3 (ordinary quality)—Formulae for Manufacture of Extracts No. 4 (quality, cheap perfumery)—Formulae for Perfumes Manufactured by using Synthetic Perfumes—Triple and Quadruple Extracts—Double Extracts—Single Extracts and Perfumed Waters—Extracts for Export—Concentrated Perfumes without Alcohol	122 193
---	---------

CHAPTER V

TOILET WATERS

Formulae for Toilet Waters—Formulae for Toilet Waters containing Synthetic Perfume—Toilet Waters with dilute Alcohol—Toilet Waters without Alcohol—Eau de Cologne	194 215
---	---------

CONTENTS

CHAPTER VI	
COSMETICS	
	PAGE
Cleansing Cosmetics—Soaps and Pastes—Shampoos—Waters for Lotions for Scalp Massage	216 232
CHAPTER VII	
COSMETICS	
Requisites for the Care of the Mouth and Teeth—Liquid Dentifrices— Dentifrice Soaps and Pastes	233 246
CHAPTER VIII	
SOFTENING COSMETICS	
Beauty Creams—Fatty Creams—Cold Creams—Creams with Soap Bases—Jellies—Starch Creams—Products for Beautifying the Nails	247 264
CHAPTER IX	
FIXATIVE COSMETICS, OILS AND POMADES	
Aromatised Mineral Oil—Pomades—Simple Fat Infusions	265 292
CHAPTER X	
COLOURED COSMETICS	
Rice Powders, Ronges and Perfumed Starch Powders—Dyes with a Silver Salt Base—Turkish Dyes—Bismuth Dyes—Vegetable Dyes —“Oreal” Phenol Dyes	293 311
CHAPTER XI	
DEPILATORIES	312 315
CHAPTER XII	
SMELLING SALTS, TOILET VINEGARS, AND SIMILAR PREPARATIONS	
Ammoniacal Perfumes and Smelling Salts	316 322
CHAPTER XIII	
INCENSE, FUMIGATORS, ETC.	323 330
CHAPTER XIV	
SACHET POWDERS	331 344
CHAPTER XV	
TOILET SOAP AND VARIOUS PRODUCTS	
Synthetic Perfumes in Soaps—Milled Soaps partially Perfumed with Synthetics—Casein Soap—Perfumes for Almond Soaps—Essence of Soap—Floating and Pumice Stone Soaps—Hyaline Block or Alum Stone	345 389
CHAPTER XVI	
SPECIALITIES AND SECRET PREPARATIONS	
Tooth Washes and Pastes—Cosmetics for Treatment of the Skin— Soaps, Unguents and Disinfectants	390 412
APPENDIX	
FRUIT ETHERS	413 414
INDEX	415 419

PERFUMES AND COSMETICS

PART I

RAW MATERIALS

CHAPTER I

NATURAL RAW MATERIALS USED IN PERFUMERY

WATER

ALTHOUGH water is very little used in the manufacture of perfumes, properly so called, it plays a considerable part in the dilution of the alcohol used in the preparation of perfumes which have very little alcohol in them, and in toilet soap base. Therefore it will not be waste of time to devote a few lines to this substance. There is no need to examine its physical and chemical properties, they are well enough known by all, and we will commence at once with the most important point, viz., the purity of water.

Water in its natural state is never pure. It always contains, in more or less considerable quantities, gases, and organic and mineral matters, either suspended, dissolved, or chemically combined. Thus in a manufacture such as we are dealing with, water containing suspended impurities should be purified by allowing the impurities to settle, or by decantation and filtration. Those which contain impurities which are dissolved or chemically combined are generally divided into soft waters and hard waters, or waters containing much chalk or sulphate of lime; and into pure waters and impure waters, according to the amount of organic matter dissolved in them. Nothing but pure soft water, or, better still, water that has been purified by distillation and filtration, should be used in the manufacture of actual perfumes. Rain-water and water condensed by steam-generators, which is

similar to distilled water, are not pure enough, and often cause trouble in the manufacturing process which is at first inexplicable, but which proves on investigation to be caused by impurities in the water.

Filtration of Water.—Whenever the water comes from—whether it be river, spring, or rain-water— it should always be filtered. This is more necessary in the manufacture of perfumery than in any other industry.

It often happens, especially in small towns, that well-water is contaminated by infiltrations of sewage material. Chemical analysis of this type of water shows a high percentage of organic matter, nitrates and ammonia. From this it may also be concluded that objectionable micro-organisms are to be found in the water, and it should never, in any circumstance, be used for perfume manufacturing purposes.

Distillation of Water.—It is often incorrectly stated that good spring water, or water that has been boiled, can be used instead of distilled water for the preparation of dilute alcohol.

Thus, certain essential oils dissolved in alcohol will bear the addition of a much larger quantity of distilled water without becoming turbid, than of ordinary or boiled water. The turbidity is generally brought about by the precipitation of the mineral salts in a colloidal form and necessitates a very careful filtration. It is especially easy to prove this when using oils free from terpene, which, when used in alcohol diluted with distilled water within reasonable limits, generally give no turbidity.

The distillation of water is very simple, but unless certain precautions are taken, the water will be little better for the distillation. To get the distilled water clear and clean for diluting purposes, the still must be perfectly clean and free from verdigris. Further, the water to be distilled must also be pure and freed from suspended matter by filtration. The still should only be filled to three-quarters of its capacity, so as to ensure that only steam enters the condenser. The distillation must proceed slowly over a gentle fire. The first portion of the distillate, slightly contaminated with metal, is rejected. About 75 per cent. of the contents of the still are now condensed, leaving the remainder, in which are to be found the accumulated impurities, in the still. This residue is then run off. The water distilled in the middle of the operation, if the still has been properly constructed, is of extreme purity, but is subject to deterioration. To preserve its purity, it is advisable to add 10 per cent. of alcohol. Unless

this is done, the cost of distillation is wasted. Carefully distilled water is excellent for the purpose of reducing alcohol. It is clear, tasteless, and without odour.

Water taken from steam engines must never, on any account, be used, as it always contains traces of oil which are very difficult to get rid of. This oil is rancid, and often contains fatty acids, which give an undesirable taste and odour to the water, and render it unfilterable.

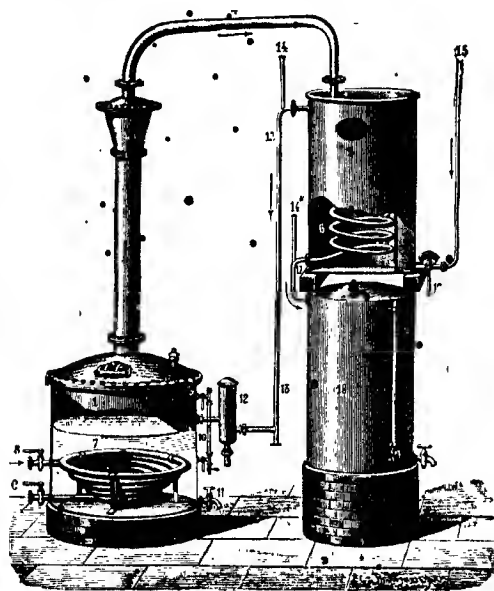


Fig. 1 — Still for distillation of water.

Deroy's still (Fig. 1) is specially constructed for the distillation of water. It works in an admirable manner, much to the satisfaction of those using it, who are able to obtain from it water which is chemically pure. It has a constant and automatic feed.

ALCOHOL

Properly speaking, this word is the common name for a special kind of alcohol—the oldest kind known, viz., ethyl alcohol. The early Arabian doctors extracted it from wine, and employed it as a medicine. To-day it is one of the most important industrial products, and thousands are employed in its

manufacture. The perfumery industry employs it largely, and for that reason it will be necessary to deal specially with it in these pages, as well as because of its many other uses and its financial importance. Ethyl alcohol, used more especially in the manufacture of essences, is not a product of nature except to a minute extent, but results from the fermentation of saccharine matters. The fermentation requires :—

1. Sugar, or a carbohydrate yielding sugar.
2. Eight times as much water as the sugar to be converted.
3. Atmospheric air, or a generator of oxygen.
4. Enough yeast to transform the sugar into alcohol.
5. A temperature of 20° to 30°.*

The raw materials which furnish the sugar are of very different characters, and are derived either from fruits, such as the grape, apple, and pear, from the conversion of starchy matters, such as rice, maize and other cereals, manioc and potatoes, or from the juice of the sugar-beet or the sugar-cane. The ethyl alcohol as manufactured in distilleries corresponds to the chemical formula (C_2H_6O). In a pure state, and completely free from water (absolute alcohol) it is a colourless liquid, very mobile and inflammable, of an agreeable and invigorating odour, and a burning taste. Its specific gravity is : 0.8095 at 0°; 0.7987 at 5°; 0.7939 at 15°; and 0.792 at 20°. Its boiling point is 78.5°; when subjected to intense cold (— 100°), the liquid becomes thick, but so far it has not yet been solidified. Commercial ethyl alcohol nearly always contains either aldehyde or other alcohols dissolved in it. These impurities are eliminated by rectification. In France, many of the distilleries refine their own alcohols, but in other countries it constitutes a special industry. The impurities which contaminate crude alcohol are classed under the generic name of Fusel Oil. These impurities are composed of a series of bodies which are formed during the fermentation as secondary products, and give a disagreeable taste to the alcohol. Little is known of their origin, which is attributed by Brefeld to the residual products of the yeast organisms; the author, on the contrary, thinks that certain of the raw materials employed have something to do with their formation.

It is certain, however, that the alcohols derived from cereals, potatoes, molasses, and sugar-beet are of a different nature from those of brandy from wine and fruits. To the first category the

* Unless otherwise indicated, all temperatures are in degrees Centigrade.

fusel oil gives a repugnant taste and smell, to the second an agreeable odour, so long as it is not present in too great quantity. The dominant bodies in the fusel oil of potatoes are the amylie, propylic, and isopropylic, butylic, and isobutylic alcohols. In that from cereals, cinnanthic ether and amyl alcohol. In molasses they consist principally of caproic, caprylic, and capric esters.

Acetic acid is found in all kinds of fermenting liquors, produced by the oxidation of the alcohol. From this acid originates ethyl acetate and numerous compound esters. Thus one finds aldehyde, and also other bodies which greatly resemble it, metaldehyde, crotonic aldehyde, and acetal. It is not yet known whether the three latter are originally contained in fermenting liquors or whether they are produced from a secondary action during the process of distillation. The impurities contained in crude alcohol may be divided into three groups.

1. *Very volatile products*

Aldehyde	boiling point	22°
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2. *Less volatile products, soluble in dilute alcohol.*

Ethyl Alcohol	boiling point	78°
Propyl Alcohol .....	..	85°
<i>iso</i> Propyl Alcohol .....	..	97°
Butyl Alcohol .....	..	108.5°
<i>iso</i> Butyl Alcohol .....	..	117°

3. *Slightly volatile products, insoluble in dilute alcohol.*

Amyl Alcohol	boiling point	130°
Ethyl Caproate .....	..	166°
Ethyl Caprylate .....	..	208°
Ethyl Caprate .....	..	244°

In distilling, the properties of these different impurities are taken into account to remove them from the crude alcohol. For this purpose, the latter is diluted to 50 per cent. strength, when the insoluble bodies, or those difficult of solution in dilute alcohol, are thrown out of solution, and can be eliminated by filtration. If afterwards the filtered crude alcohol is distilled, the aldehyde, which is very volatile, is found in the first runnings. Ethyl alcohol then comes over in an almost pure state of 95—96% strength.

Finally, dilute alcohol contaminated with impurities distils over at a higher temperature, and forms the tailings of the distillation. By the fractionation which occurs in the process the bodies of different boiling points are separated as much as possible; but a complete separation is not achieved, as volatile bodies, even with widely different boiling points

always distil over with traces of bodies of different boiling points. Thus the first runnings always bring over a proportion of alcohol varying according to the perfection of the still, although the difference between the boiling points of alcohol and aldehyde is 55° , so that to be able to eliminate all traces of aldehyde a certain quantity of alcohol must be run off. This is set apart. As there is far less difference between the boiling points of propyl, butyl, and ethyl alcohols than there is between ethyl alcohol and aldehyde, the first two alcohols always distil over with the alcohol, but in such small proportions that they are negligible.

Testing the Purity of Alcohol.—Many methods have been recommended for the examination of industrial alcohol for impurities. Some of these are directed towards estimating the whole of the impurities, others only those of the first runnings, or of the tailings. It is certain, however, that none of these methods gives exact results, but each of them gives a good qualitative indication of the substance which they purport to detect. Amongst the first mentioned, the best known is that of Røse, based upon the solubility of fusel oil in chloroform, and that of E. Barbet, in which the total impurities are indicated by the reduction of potassium permanganate. After this, Godefroy's method, which, by the use of petroleum ether and sulphuric acid, separates the impurities of the first runnings and the tailings successively.*

The special reagents for the impurities in the first runnings are: ammoniacal silver nitrate, which is reduced; potassium hydrate, which turns brown; sodium diazo-sulphanilate, which turns red—when brought into contact with aldehydes.

The impurities of the tailings are detected by concentrated sulphuric acid, which turns brown; by petroleum ether, followed by sulphuric acid, which causes the same reaction; and by aniline acetate, which turns red in the presence of furfural.

The problem of the estimation of the impurities in industrial alcohol is far from being solved, as much because of the varied nature of the bodies with which one has to deal, as because of the minute amount of each of them in a mixture where the whole quantity is often infinitesimal.

Smell and taste are almost always certain guides as to the purity of alcohol. One has only to dilute the suspected alcohol

* If exact results are required, text-books on analytical chemistry should be consulted.—E. J. P.

with water, and to evaporate a small quantity by friction in the palms of the hands, or to drop 1 gram of alcohol in a little boiling water and examine it. After a moment the smell of the fusel oil, if present, is readily distinguishable.

The presence of amyl alcohol is revealed by evaporating to half its volume a mixture of 10 grams of alcohol with a few drops of a solution of potassium hydrate. The residue is then saturated with dilute sulphuric acid, and the presence of amyl compounds is detected by their characteristic odour. Without entering into the details of the process of rectification, the three following products are obtained from it:—

1. *The First Runnings of Alcohol*.—A mixture of ethyl alcohol and aldehyde, which boils at a temperature below 78°.

2. *Pure Alcohol*, which in itself includes several qualities; whether it be drawn off immediately after the first runnings and contains traces of aldehyde, or whether it be drawn just before the tailings and already contains some of the impurities of a high boiling point. The alcohol distilled between these two products constitutes the middle runnings, and is finer and purer the further away it is from the two extremities indicated.

3. *The Tailings*.—Composed of a little ethyl alcohol with amyl and other alcohols of high boiling points. The essential oils (fusel oil) remain in the still with the water, and constitute the residues of distillation of the crude alcohol.

The art of refining consists in obtaining the greatest quantity of middle runnings possible. Therefore, the purest crude alcohol obtainable must be used, as from it more middle runnings and less first runnings and tailings will be produced.

Alcohol Determination.—It is of the greatest importance, to the seller as to the buyer, to know the real content of absolute alcohol in an alcoholic solution. The method employed is based on the difference of the specific gravity of water and alcohol, taking into account the contraction which takes place by mixing the two liquids. To ensure that this method is exact, it is necessary to be careful that the alcoholic mixture is composed of nothing but water and alcohol, as all other matters present will influence the specific gravity and lead to inaccurate results. We shall only treat in these pages of the mixtures of water and alcohol, which are found in commerce under the names of alcohol; spirits, brandy, etc. The very small quantities of colouring matter, oils, and esters which are found, for example, in natural rum and cognac, do not exercise more than a slight influence

on the indications of the specific gravity, and may be neglected, as the errors which result from them are very slight.

The aleoholometer generally used in France is that of Gay-Lussac. The two extreme points of this instrument—0 and 100—indicate first pure water (0), secondly, absolute alcohol (100). The intermediate degrees show the percentage of alcohol by volume, that is to say, the number of cubic centimetres of absolute alcohol which are contained in 100 c.c. of the liquid tested. The instrument being graduated at 15°, the readings are not true unless the liquid to be tested is at this temperature. If it is not, a table of corrections (an “excise” table) enables one to convert to its actual strength that indicated by the alcoholometer for a solution of alcohol of a different temperature. This table is usually provided by the makers of alcoholometers. It is not necessary to reproduce it here.

Tralles’s alcoholometer, used principally in Germany, corresponds to that of Gay-Lussac, used in France. In 1888 it was practically replaced by Richter’s alcoholometer (determining by weight instead of by volume).

The thermo-alcoholometers prescribed by the new law differ from the older ones in that the thermometer is not graduated on the Réaumur, but on the Centigrade scale, and also in that the scale records the alcohol by weight instead of by volume. The older instrument gave the percentage by volume of alcohol at 12·5° Réaumur, whilst the new one gives the percentage by weight at 15° Centigrade. This is an improvement which was necessary and advisable.

A change in temperature in a liquid causes a change in volume; but a kilogram is always a kilogram, and the calculation is simplified, both for excise purposes and for the manufacturer. This alteration ought to facilitate commercial transactions. The following table shows the relationship between the readings by weight of Richter’s instrument and those by volume of Tralles’ :—

Tralles (volume).	Richter (weight).	Tralles (volume).	Richter (weight).
0	0	70	62·5
10	8	72·5	65
12·5	10	74	67
20	16	75	68
30	24·5	80	73·5
40	33·5	85	79·5
42	35	85·5	80
50	42·5	89·5	85
60	52	90	85·5
65	57	200	100

We do not labour the value of the modern instrument, but we direct attention to it because chemists and manufacturers are certain to meet with it in their work, with its new indications, and it is right that they should not come across it unexpectedly.

As we have already pointed out, alcohol is very hygroscopic, and forms with water several hydrates, with elevation in temperature and contraction in volume. Thus 53·9 volumes of absolute alcohol and 48·8 volumes of water do not yield 102·7 volumes of mixture, but only 100 volumes.* These values correspond approximately with the formula $C_2H_6O + 3H_2O$. But outside this limit, further addition of water produces neither elevation of temperature nor contraction of volume. Fries's table, which is given on p. 10, is based on these facts.

This table is used in a simple manner. If one wishes to convert 95 per cent. alcohol into 85 per cent. alcohol, the column headed 95 per cent. is referred to, and the figure 85 per cent. into which it is desired to convert the alcohol is sought for in column 1. The figure corresponding to 85 per cent., which is found in column 2 (95 per cent.), is 13·3. This means that it is necessary to add 13·3 volumes of water to 100 volumes of 95 per cent. alcohol to convert it into 85 per cent. alcohol. Similarly, to convert 75 per cent. alcohol into 35 per cent. alcohol, it is necessary to add 117·8 volumes of water to 100 volumes of the alcohol.

Absolute Alcohol.—Alcohol of 96–98 per cent. strength is usually sufficiently strong for perfumery purposes and is obtainable commercially of a high degree of purity. But there are cases in which absolutely pure anhydrous alcohol is required. In such a case (the manufacture of Eau de Cologne, for example), the perfumer will be wise if he himself prepares such an alcohol from a concentrated alcohol derived from wine. But he should not use the ordinary method of dehydration, which consists of treating 96 per cent. alcohol with caustic lime. Alcohol so prepared has a flavour which is difficult to get rid of, and which defeats the required end. Anhydrous calcium chloride should be employed, which should be strongly heated just before being used. It is only thus that an absolute alcohol is obtained having the necessary characters.

FATTY BODIES

Neutral fatty bodies, which may be the products of animal secretions or be derived from the vegetable kingdom, have in

FRIES' TABLE FOR CALCULATING THE AMOUNT OF WATER NECESSARY TO CONVERT 100 VOLUMES OF ALCOHOL INTO WEAKER SPIRIT

Column 1.	Alcohol												
	95 °	94 °	93 °	92 °	91 °	90 °	85 °	80 °	75 °	70 °	65 °	60 °	55 °
90	6.4	5.1	3.8	2.5	1.3	—	—	—	—	—	—	—	—
85	13.3	11.9	10.6	9.2	7.9	6.6	—	—	—	—	—	—	—
80	20.9	19.5	18.1	16.6	15.2	13.8	6.8	—	—	—	—	—	—
75	29.5	27.9	26.4	24.9	23.4	21.9	14.5	7.2	—	—	—	—	—
70	39.1	37.5	35.9	34.3	32.6	31.0	23.1	15.3	7.6	—	—	—	—
65	50.2	48.4	46.7	45	43.2	41.5	33.0	24.6	16.4	8.1	—	—	—
60	63.0	61.1	59.2	57.3	55.5	53.6	44.4	25.4	26.4	17.6	8.7	—	—
55	78.0	76.0	73.9	71.9	69.9	67.8	57.9	48	38.2	28.6	19	9.5	—
50	95.9	93.6	91.4	89.2	87.0	84.8	73.9	63.1	52.4	41.8	31.3	20.8	10.4
45	117.5	115.1	112.6	110.2	107.7	105.4	93.3	81.3	69.5	57.8	46.1	34.5	22.9
40	144.4	141.7	139.0	136.2	133.5	130.8	117.3	104.0	90.8	77.6	64.5	51.5	38.5
35	178.7	176.6	172.5	169.4	166.3	163.3	148	132.8	117.8	102.8	87.9	73.1	58.3

either case so much chemical and physical resemblance that they may be classed together. The importance of their employment in perfumery may now be instanced.

Neutral fatty bodies are (with exceptions which need not here be noted) compounds, known as esters, of the triatomic alcohol glycerine, with various fatty acids such as stearic, oleic, and palmitic acids, etc. Chemically pure neutral fats are glycerides, and are formed of varying proportions of stearine, oleine, palmitine, etc.

So long as the fatty acids belong to the same series, *i. e.* the saturated series, a given fatty acid, or its glyceride, will usually be more solid and have a higher melting point as the number of carbon atoms it contains increases.

Natural fats usually contain, besides glycerides, small quantities of free fatty acids, which have considerable influence on their taste and odour.

All are products of animal or vegetable origin, and are produced by the conversion of starchy matters into carbonic acid and glycerides. The fatty tissues of animals are found either immediately under the skin, as in the pig, enveloping the abdominal organs, or interposed between the muscular tissues. The medullary and cervical substance is composed of neutral fatty bodies. In vegetables, the fatty body is contained in the seeds and sometimes in the flesh of the fruit (olive oil, coco-nut oil). Animal fats are obtained by melting; vegetable oils and fats by pressure and by extraction. Cold pressure produces the best quality fat; by using a gentle heat the yield is increased, but the quality suffers. Whichever process of expression is used, hot or cold, the fatty bodies obtained will always contain a certain amount of water and impurities, which must be eliminated, as otherwise the fat would rapidly alter and become useless in the manufacture of perfumery.

Refining of Fats.—In the author's work on the manufacture of essences and perfumes a chapter was devoted to the preparation and refining of fats, to which the reader is referred. There are more modern and more efficient processes, but these processes can only be applied to animal fats, and to solid vegetable fats, and not to oils, which must remain liquid when used in manufacturing processes.

In order to avoid any considerable loss, the manufacturer may be content with a partial purification, which consists in placing a given weight in a copper heating vessel, adding to it

several pails of water, and heating it to boiling point after adding some ordinary salt. Impurities floating on the surface are then removed by skimming, the fire is withdrawn, and the liquid allowed to stand for several hours, when the clarified oil is decanted in the usual manner. To refine the oil further, that is, to bleach it without the employment of acids, the fat should be placed in a copper vessel, and 25 to 30 kilos. of water added for each 100 kilos. of fat, unless a direct steam jet is available, which is preferable to the use of water. The mass is heated until completely melted. The temperature being at about 75°, 3 kilos. of caustic-soda lye (40° Beaumé) are added for each 100 kilos. of fat, and the temperature is raised to boiling point, with constant stirring. The mass is now in the form of a milky fluid. From 12 to 15 kilos. of refined salt are now added, which dissolves rapidly as the temperature is raised, and the liquid is well stirred; a mass of scum which is of a dirty grey colour and contains most of the more or less coloured impurities of the crude fat rises to the surface. After having slowed down the current of steam and withdrawn the stirrer, the small quantity of soap formed on the surface is removed. This is continually frothing and will overflow the boiling vessel if not frequently removed. If the scum is so light as not to be easily removable, a little salt added to the liquid will convert it into floating soapy masses which are easily removed. The operation is completed when the scum has ceased to form, and in its place appears a light transparent froth.

The oil is then a transparent, pale liquid, and the steam should be turned off, the boiling vessel covered over, and the contents allowed to settle for at least one night. The saline liquid settles to the bottom and can be drawn off when desired.

There is, of course, a loss of fat in such a refining process. But products prepared with such a refined oil will probably keep much longer than those prepared with unrefined oils, and the improvement in the perfume more than compensates for the extra cost of refining.

Solid vegetable fats, as well as suet and lard, can be refined in this manner.

Fats obtained by extraction with organic solvents do not contain the same impurities as fats obtained by pressure. Sulphide of carbon and petroleum ether are the usual solvents employed.

Taken at a temperature of 15°, fats are either liquid, semi-

solid (such as butter), or completely solid, such as suet, wax, or spermaceti.

All these substances are lighter than water, their specific gravity varying according to their age and method of preparation. They are insoluble in water, very slightly soluble in cold alcohol (with the exception of castor oil), rather more soluble in hot alcohol, and soluble in all proportions in ether, chloroform, carbon bisulphide, and essential oils.

They are not volatile, that is, they do not distil without decomposition. At a high temperature they decompose with the evolution of acrid vapour, due to the formation of acrolein. If the temperature be very high, they are decomposed with the formation of gaseous bodies which burn with a very luminous flame.

If they are treated under pressure with superheated steam, they are saponified. Saponification also results by heating with caustic soda, caustic potash, or ammonia.

The principal glycerides present in solid fats are stearine, palmitine, and oleine; the proportion of oleine is less as the melting point increases.

All solid fats liquefy at temperatures dependent upon the relative proportions of the glycerides they contain. In the same way, liquid fats deposit solid glycerides when they are cooled to a sufficiently low temperature. All oils become more or less turbid on cooling with the exception of the drying oils of the linseed type, which remain clear down to -15° .

The melting or solidification point of oils varies according to the age or method of preparation of the oil. Freshly-prepared fats have a sweet and agreeable odour and taste, and do not redden blue litmus paper. But under the influence of air and moisture, especially when kept in the light, they decompose, with the formation of free fatty acids. They then develop a sharp, acid taste and a disagreeable odour, and turn blue litmus paper red. The decomposition is, of course, only partial. The more volatile fatty acids are separated from their combination with glycerine and are responsible for the disagreeable odour and taste. The methods of removing these free fatty acids are those above described.

All fatty oils tend to thicken under the influence of air. Some of them, when exposed in thin layers, are converted into solid transparent layers, whilst others remain quite liquid, however thin the exposed layer may be. Those which solidify are the

so-called drying oils, with which perfumery is not concerned, such as linseed oil. Non-drying oils, such as olive oil, almond oil, etc., are those which are of interest to perfumers. There is a group of oils intermediate between the two, such as sesame oil, which for the purpose of the perfume manufacturer may be called "indifferent" oils.

LIQUID FATS—OR OILS

Olive Oil.—Olive oil is expressed either from the flesh of the olive, or from the entire fruit including the kernel. But the oil obtained from the kernel is not identical with that obtained from the flesh of the fruit.

Provence, especially in the neighbourhood of Aix, furnishes the best olive oil. Lunca oil, and that obtained at Genoa and Nice, are the oils which may be described as second quality oils.

The mature fruits, separated from the kernels, are crushed and pressed. Virgin olive oil, the result of the first pressing, is clear and limpid and correspondingly expensive. Very high pressure furnishes a second quality, which is somewhat turbid and only becomes clear after sedimentation. A good quality oil is of a pale to golden-yellow colour, with a faint but sweet taste and slight, agreeable odour. It deposits solid glycerides at about $+6^{\circ}$, and solidifies at about $+1^{\circ}$ to $+2^{\circ}$. Inferior grades become solid at somewhat higher temperatures.

Second Pressings or Green Olive Oils.—The cakes of the first pressing mixed with over-ripe or bruised olives are digested with boiling water, and then, on cooling, pressed again. The oil thus obtained is turbid, deep yellow, or greenish in colour, and of a disagreeable odour, so that it cannot usefully be employed in perfumery. It can only be used for soap manufacture or other industrial purposes.

It is unnecessary to deal with bleached olive oil, which has no special employment in perfumery, and differs little from ordinary "first pressing" oil.

The latter is suitable for enfleurage, that is, the obtaining of perfumes and essential oils from certain plants which contain them in only small quantities. It is also suitable for the manufacture of cosmetic oils, which will be dealt with in due course. Second quality olive oil is suitable for the manufacture of domestic soap, and sometimes even for toilet soap.

It will be readily understood that it is the finer qualities of olive oil which are more commonly adulterated. The perfumer

should therefore examine his oil most carefully. The oils most commonly used for the purposes of adulteration of olive oil are sesame, earth-nut (arachis), cotton-seed and especially poppy-seed. The claidine test easily reveals the last-named oil, since olive oil, which is not a drying oil, is completely solidified by this reaction in eight to ten minutes, whilst poppy-seed oil yields a fluid mass even after a long time. But if one has to deal with arachis oil, detection of the adulterant is more difficult, and can only be relied upon by separating arachidic acid from the mixture, a process which must be carried out by a skilled analyst.

Sesame Oil.—The oil expressed from the seeds of *Sesamum orientale* makes an excellent substitute for olive oil. The first pressings are of a pale yellow colour, almost as pale as almond oil. It has no odour and its taste is sweet and agreeable. It thickens at $+3^{\circ}$ and solidifies at -3° . The oil is employed in perfumery, soap-making, and in the ordinary enfleurage processes. Its use, however, is, unfortunately, limited by the fact that it resinifies somewhat rapidly.

Almond Oil. This oil is, *par excellence*, the best for the preparation of cosmetics. It is obtained by expression from the fruits of bitter and sweet almonds. It is of a pale yellow colour, a little more viscous than olive oil, but still perfectly fluid and completely inodorous. Its taste is agreeable and slightly sweet. Its specific gravity is 0.915 to 0.920. It commences to deposit at -10° . It is soluble in 60 parts of cold and in 20 parts of hot alcohol. The oils obtained from the bitter and the sweet almond are identical.

Peach Kernel Oil is often substituted for almond oil. As the physical characters of these two oils are the same, it is necessary to apply a chemical test for detecting adulteration. A mixture of sulphuric acid and nitric acid gives a sufficient indication. Pure almond oil gives a practically colourless mixture, whilst peach kernel oil gives a pink coloration. If the mixture becomes a deeper red, sesame oil is probably present. To be certain of this, the following procedure should be adopted—mix 1 vol. of oil with 1 vol. of hydrochloric acid in which is dissolved a little sugar. The mixture is then well shaken. After standing for a few minutes the hydrochloric acid shows a well-marked red colour in the presence of even small quantities of sesame oil. The presence of olive oil is only detected by its odour, deeper colour or by chemical analysis.

Oil of "Ben."—This oil is expressed from the nut known

under this name, of which the best variety is grown in Egypt—the more inferior in India. The latter is smaller than that from Egypt.

The oil is finer than almond oil and is not so liable to oxidation. It is of a yellow colour, odorous, and of exquisite taste. It does not congeal above $+10^{\circ}$. Its specific gravity is about 0.910. It is used only for delicate enflourage processes and the preparation of expensive cosmetics, and is difficult to procure.

Castor Oil is expressed from the seed of the castor oil plant, originally grown in India, but now found in most countries with a hot climate. The oil is obtained by expression, either hot or cold, of the decorticated seeds. The first pressing, which takes place in the cold, yields very little, but the oil is colourless and very clear. The second pressing (hot) yields more, but the oil is more coloured and has a disagreeable taste. The second pressings can be improved by mixing the oil with an equal quantity of water, and boiling the mixture, allowing it to stand and separate, and then filtering the oil. Castor oil is intermediate between the drying and the non-drying oils. In very thin layers it solidifies almost completely. It is a colourless liquid, or at most slightly yellow, rather more viscous than most other oils, resembling a saturated solution of sugar in this respect, and has very little odour and an agreeable taste when freshly prepared. It becomes rancid on keeping.

Like olive oil, castor oil deposits solid matter on cooling and solidifies at -18° . On keeping, it becomes thicker and eventually resinifies. It is soluble in alcohol to a greater degree than any other fatty oil; and to a certain extent in petroleum ether, which it also dissolves. Its specific gravity varies from 0.950 to 0.970.

Castor oil contains three fatty acids not common to other oils, namely, ricinoleic, ricinic, and ricinostearic acids. Castor oil is used in soap-making, especially transparent soaps, to a considerable extent. The chemical examination of this oil yields excellent indications of its purity. Its easy solubility in alcohol is a safeguard against the addition of other fatty oils. Equal volumes of 90 per cent. alcohol and castor oil should be quite clear, but the presence of more than a trace of other oils renders the mixture turbid.

Neatsfoot Oil.—This oil is scarcely ever found to-day in a state of purity, most oils so called being factitious. The genuine oil is extracted from the hoofs of the animal. It is a semi-fluid

mixture at ordinary temperatures, in which solid stearin remains suspended in the liquid oleine. It does not easily become rancid. When pure, it is useful in the manufacture of specially fine pomades, which are rendered more solid by the addition of a little paraffin wax. It possesses, however, no advantage over olive oil.

SOLID AND SEMI-SOLID FATS

Lard.—This fat, rendered from certain parts of the domestic pig, differs slightly in properties according to whether it has been obtained from the fatty tissues situated directly beneath the skin, or from the more internal fat layers of the animal. It is from the latter source that lard of the necessary consistency for pomades and certain soaps is obtained. Lard rendered by mixing the fat obtained from all the various parts of the body is not so useful in this respect as the lard rendered solely from the more internal tissues. The feeding of the animal has considerable influence on the character of the fat. Hungarian pigs, for example, fed mainly on acorns, yield a lard which is too soft for most perfumery purposes. In any circumstances, the manufacturing perfumer will be wise if he subjects the crude product as met with in commerce to a refining process such as has been indicated above, and he should only use a water-bath or steam to melt the lard, as otherwise he may impart to it the "cooked" taste which it so easily assumes when exposed to a naked flame.

A qualitative examination of this substance which is comparatively inexpensive, may be made in the following manner. A test-tube is half filled with the lard to be examined and melted on a water-bath. If the lard is pure, the liquid is quite transparent. If, however, it contains borax or similar adulterants, it will be turbid and will eventually separate into a transparent liquid with such impurities at the bottom of the tube. A rough and ready method of testing for the presence of water is to throw a small piece of the lard on to a red-hot coal. If water is present, a decrepitation, due to the rapid formation of water vapour, is easily discernible, whereas this is not the case with lard free from water. America exports large quantities of lard, which is often found to yield a reaction for cotton-seed oil. It is very rarely that this is due to adulteration, but is the result of feeding the pigs on cotton-seed cake; the cotton-seed oil is absorbed, but leaves the resulting fat of the pig slightly contaminated, so that it yields the cotton-seed oil reaction.

Becchi has suggested the following method for testing lard. The fat is heated on the water-bath with an equal volume of an alcoholic solution of nitrate of silver for 7 or 8 minutes. If cotton oil be present, a brownish or even black coloration results, according to the amount of cotton-seed oil present. A more decisive test is to heat the oil in a solution of amyl alcohol with a solution of sulphur in carbon bisulphide. In the presence of cotton-seed oil a red coloration results (Halphen's reaction). It should be remembered that lard obtained from hogs which have been fed on cotton-seed cake, as indicated above, will yield these reactions. Salt is indicated by the formation of the easily recognised precipitate of silver chloride when treated with silver nitrate.

Suet.—The fatty secretions of ruminating animals are included in the term "suet." The term is usually qualified by the name of the animal producing it, as, for example, beef suet, mutton suet, etc.

The perfume industry is hardly concerned with any suet other than beef suet, and, for certain purposes which will be dealt with later, suet from the calf.

Beef suet is employed to some extent in the manufacture of toilet soap.

Coco-nut Oil.—The oil expressed from the flesh of the coco-nut (coprah) is used in the manufacture of certain types of soap, but its use in other branches of the industry is limited.

Cocoa Butter, which is a quite different product from coco-nut oil, is obtained by expression from the decorticated and lightly roasted fruits of the cocoa bean (*Theobroma cacao*), which contain up to 50 per cent. of fat. It is a solid fat of a pale yellow colour, of specific gravity about 0.900 and melting at about 34° to 35°. It possesses a slight odour and flavour of the cacao bean, and does not become rancid by exposure to the air for a considerable period. It is soluble in ether, and if, when one part is dissolved in three parts of ether, the solution separates any solid matter, adulteration is certain. Equally, if 3 parts are dissolved in 2 parts of benzene, the solution should be perfectly clear.

Other fatty oils might be described, but as their employment in the perfume industry is limited, it is not necessary to discuss further this class of perfumery raw material.

Antiseptics to Prevent Rancidity.—All fatty bodies are more or less subject to become rancid. This must be guarded against, since, in spite of previous purification, rancidity may develop

and cause serious trouble. In order to obviate this, gum benzoin or benzoic acid may be used. Both these bodies possess antiseptic properties sufficiently strong to achieve the desired end, but as they have a distinct, although pleasant odour, their employment is limited. Salicylic acid is a most useful antiseptic, and as its price is now very low, it is very frequently used. Boric acid is also a most useful antiseptic, very low in price, without any odour, and sufficiently powerful to preserve oxidisable fats from turning rancid. Its use is rapidly becoming more general in the perfume industry.

Lanoline.—This fatty matter is obtained from crude wool, either by extraction by means of carbon bisulphide or from the waters used in de-fatting the wool. Liebreich was the first to recognise that this fatty matter was able to absorb more than its own weight of water, and, in the form of this stable emulsion, to be readily absorbed by the pores of the skin. The pure fat is of considerable value in the manufacture of pomades which are used on the skin. Well-purified lanoline keeps indefinitely without becoming rancid. As met with in commerce, it is yellowish or almost white, nearly odourless, in the form of an unctuous paste, neutral in reaction. It usually contains 25 to 30 per cent. of water, but may be obtained in the anhydrous condition. When containing water, it melts, and separates into two layers at about 40°. The lower layer consists of water, and the upper of anhydrous lanoline which sets to a yellowish, semi-transparent mass. When warmed, anhydrous lanoline will absorb 105 per cent. of its own weight of water, if the latter be well stirred in. Lanoline is, of course, not soluble in water, and only slightly soluble in alcohol. Its best solvents are ether, petroleum ether, and acetone.

A mixture of 80 per cent. of lanoline with 20 per cent. of cocoa butter is an excellent base for high-grade pomades, perfumed with delicate odours such as vanilla, rose, etc. Lanoline may be purified by washing with a dilute solution of soda. The free fatty acids are saponified, and a milky emulsion is obtained which can be separated in a centrifugal machine into two layers, the lower containing the soap, and the upper the lanoline, still slightly impure. A small amount of the soap is emulsified with the fat, and may be removed by adding a little milk of lime, which forms an insoluble soap which can be removed by washing the lanoline with water several times. To obtain an absolutely pure lanoline, the product is then completely dried, dissolved in acetone,

allowed to stand, the clear liquid drawn off, and the acetone removed by distillation. To this highly purified product 25 per cent. of water is added, and the lanoline is then the pure hydrous lanoline of commerce.

Lanoline must be kept in well-closed vessels and in a cool place, otherwise water will evaporate from the surface and the substance darkens and becomes coated with horny transparent matter.

White and Yellow Wax.—Beeswax is the substance produced by the ordinary bee to build up the skeleton of the honeycomb. After the honey is collected, the crude wax is melted in water, strained and cooled in appropriate moulds, either as bars or as small cakes. The colour of ordinary beeswax, which is of a varying yellow or brown, depends upon the food of the bee and the flower which furnishes the saccharine material. African and American wax, for example, are usually of a full brownish colour. Beeswax has a pleasant odour recalling that of honey. Its fracture should be dry and granular, with a chalky-white appearance (when adulterated with suet or similar substances the fracture is entirely different). The heat of the hand softens it; on mastication it does not tend to adhere to the teeth as is the case with wax adulterated with resin. Its melting point is about 60° to 64°. It is insoluble in water and in cold alcohol, but dissolves partially in ether and in hot alcohol. It is completely soluble in warm fatty and essential oils, petroleum ether, chloroform, and carbon bisulphide. Its specific gravity is from 0.960 to 0.970. Asiatic wax is a little heavier than most European specimens. When adulterated with suet, etc., the specific gravity is lowered.

To bleach wax, it is sufficient to melt the crude, pure wax on the water-bath and pour it into cold water in such a way as to allow it to solidify in thin strips, which are then exposed on linen cloths, when sunlight, air, and moisture will bleach it to an almost white colour. The wax is wetted frequently and turned over every six hours. Wax may also be bleached chemically, when the process is much quicker (by, for example, boiling a mixture of dilute sulphurous acid and calcium chloride with the wax), but chemically bleached wax is brittle and requires softening with at least 3 per cent. of suet. If suet is present to the extent of over 5 per cent., the addition is regarded by perfumers as an adulteration, and the wax would not be regarded as of good merchantable quality. White wax develops free fatty acids more rapidly than unbleached wax, and takes on a disagreeable odour

which it communicates to any other fatty matter with which it may come in contact. Unless its use be regarded as absolutely necessary, white wax should, therefore, not be used in perfumery.

From the chemical point of view beeswax is a mixture of about 20 per cent. of free cerotic acid with 80 per cent. of esters in which glycerine, the usual alcoholic constituent of fats, has been replaced by myricyl and ceryl alcohols. It is this absence of glycerine that causes burning beeswax, if pure, to be free from the odour of acrolein, which is characteristic of glycerides when burned.

Beeswax is often adulterated. The principal substances used for sophistication are Japan wax, paraffin wax, resin, stearine, and suet. Very rarely one meets with adulteration with starch, ochre, or other mineral matter. This is easily detected by dissolving the wax in hot turpentine, when, instead of obtaining a clear solution, an insoluble deposit is yielded, varying in appearance with the nature of the adulterant. We have already pointed out that the presence of resinous matter is detectable by the peculiar adherence to the teeth on mastication, which is not the case with pure wax.

Spermaceti. This waxy substance is formed in the orbital cavities of the head, as well as in a kind of medullary tube situated under the skin, of various species of whales, especially the so-called sperm whales, and to a small extent the dolphins of the South Polar seas; this medullary tube commences in the interior of the head and is prolonged as far as the termination of the spinal cord in these mammalian sea animals, large quantities of spermaceti being obtained from a single animal. It occurs as a solution and suspension of the solid spermaceti in a true liquid oil, sperm oil. Spermaceti separates on cooling the oil as a mass of small crystals, which are purified by repeated washing with alkali (a dilute solution of potassium carbonate), and then remelting and solidifying in ingot or saucer-shaped moulds. When pure, spermaceti forms a very white mass with a brilliant, haecous and crystalline fracture. It has a faint, indescribable odour and an agreeable fatty taste. Its specific gravity is about 0.943 and melting point 45–50°. It does not stain unglazed paper. It is soluble in 7 parts of warm alcohol, or in 35 parts of cold alcohol; and is readily soluble in ether, chloroform, or carbon bisulphide. It is, however, but slightly soluble in petroleum ether.

Spermaceti consists, in the main, of cetyl palmitate. It is employed to a fair extent in perfumery, chiefly in the manufac-

ture of solid preparations or "concretes." It may not, therefore, be without interest to direct attention to its more common adulterants.

If stearine be present, the fracture will be more conchoidal, and the texture more granular. As stearine usually contains free stearic acid, when a spermaceti so adulterated is mixed with a boiling solution of potassium carbonate, effervescence will result due to the evolution of carbonic acid gas, which is not the case with pure spermaceti. Suet is indicated by the permanent stain produced on unglazed paper, and by the odour evolved on heating.

Liquid Hydrocarbons—so-called Mineral Oils.—The oils known as mineral oils have been in use for many years; they consist of mixtures of various hydrocarbons of natural origin, found in various parts of the world, sometimes as oils only, sometimes mixed with water. They were not, at first, used to any extent for burning, lubricating, and medicinally but as their value for these purposes became more recognised by the continued work of the petroleum technologists, their employment increased correspondingly. To-day the mineral or petroleum oils form an exceedingly important group of commercial substances, which may be referred to here, as they have a certain use in perfumery.

Crude petroleum, such as is obtained in America, is certainly a product of a natural "dry distillation," that is, it is formed by the action of heat on organic matter, causing it to decompose in the absence of air. Its formation is due to the heavy deposits of marine algae, etc., in prehistoric times buried and altered in the terrestrial deposits, as a result of geological changes, and which, under the action of the earth's internal heat, yielded the hydrocarbon products. Pennsylvania, Canada, and Virginia in the Western Hemisphere, Baku, on the Caspian Sea, and Galicia are areas which produce very considerable quantities.

The liquid at first gushes from the well, but when the accumulation of compressed gas has ceased, it must be raised, and mixed with water of a greenish colour, and disagreeable odour, by means of very powerful pumps. It is then allowed to settle in enormous tanks, when it separates into an aqueous layer and a layer of crude petroleum. The latter is submitted to a series of fractional distillations and a whole series of hydrocarbons, of different boiling points, is obtained. Each fraction thus obtained is a mixture of several distinct hydrocarbons.

Petroleum ether or naphtha is the earliest fraction collected. It distils between 40° and 70° , and is used as a solvent for the extraction of certain essential oils and perfumes. Its specific gravity is about 0.665, and it evaporates with the warmth of the hand and has hardly any odour, especially after being rectified. Benzine is of a higher boiling point, about 80° to 100° , and has a specific gravity about 0.690 to 0.705. It has but little odour when well rectified, and is used in the extraction of fats, the cleaning of cloth, and in the perfume industry for the purpose of utilising residual fatty matters. Ordinary cleaning petroleum boils between 120° and 130° , burning paraffin between 150° and 250° , and mineral lubricating oils at temperatures much higher than these. The still higher boiling hydrocarbons are left in the still and are known as soft petroleum, or petroleum jelly.

Petroleum jelly is simply a variety of paraffin, less solid and of lower melting point. It is obtained by heating by steam the impure petroleum residues to about 30° , and when sufficiently soft shaking with 10 per cent. sulphuric acid (60° Béaume) and finally leaving it to settle. The layer of oil obtained is heated to 80° , and 10 per cent. of its weight of dry animal charcoal is added. It is then clarified by decantation, and filtered through a steam-heated charcoal filter. It becomes whiter each time it is filtered. The clear oil, free from tarry matter, is transferred to a copper vessel where it is heated by steam to 250° . A sample taken after about two hours indicates whether the operation is finished.

The steam is then shut off, and it is filtered once more, and is then ready for use. It is now a clear semi-transparent substance, of a buttery consistence, with a specific gravity about 0.885, odourless and tasteless.

Thus prepared, petroleum jelly should not turn brown when mixed with concentrated sulphuric acid and warmed for twenty-four hours on a water-bath, and thoroughly shaken from time to time.

Another test is to replace the sulphuric acid by a small fragment of sodium. This metal will rapidly lose its characteristic brightness if the petroleum jelly still contains sulphur or oxygen compounds.

Boiling alcohol brought in contact with the petroleum jelly should not turn litmus paper red; if it does so, it indicates the presence of sulphuric or organic acids.

Paraffin.—Although paraffin is simply a mixture of hydrocarbons more solid and of higher melting point than petroleum jelly

the name is used for similar bodies which are found dissolved in the residues of the dry distillation of the hydrocarbons of tar, lignite, and peat. They are also contained in the residues of petroleum, but in such quantities that it is not always worth the cost of extracting them, as a 10 per cent. yield is necessary if the extraction is to be worth while.

The best lignites for obtaining this material come from Saxony. The south of Hungary also yields a bituminous schist, which yields a considerable quantity of solid paraffin.

The first product from the distillation of lignite is a fairly clear brown oil which on fractional distillation first yields burning oils, etc., and it is not until over 200° that oil containing solid paraffin is obtained.

Mineral oil which is treated successively by sulphuric acid and solution of caustic soda is decolorised, and eventually, when sufficiently cooled, deposits brilliant flakes of solid paraffin.

The use of centrifugal force and high pressure removes practically all the adherent oil from the solid matter. This is remelted, poured into moulds, and is then ready for use. It is a white, semi-transparent mass, with very little if any odour, unctuous to the touch, and melting at different temperatures according to the fraction of the substance dealt with.

To obtain solid paraffin completely odourless and tasteless, it should be dissolved in a suitable solvent and recrystallised, but this is seldom done. It is insoluble in water, only slightly soluble in boiling alcohol, but easily soluble in ether, petroleum ether, carbon bisulphide, and fatty oils. It is not attacked by acids or alkalis. Its melting and boiling points vary over a wide range. It consists of a mixture of hydrocarbons, the melting and boiling points of which rise with the number of carbon atoms they contain.

It is used in the preparation of various creams, lip-salves and similar substances. It is very useful in rendering corks impermeable to liquids.

Ceresine, Mineral Wax, or Ozokerite.—This form of paraffin is found in fairly large quantities in the schists round about the neighbourhood of petroleum wells.

Galicja, Hungary, Baku, and various districts of North America are the principal sources of this material. It is submitted to a preliminary melting to remove mineral matter, which often reaches as much as 15 per cent. in the raw material. By distillation, a yield of about 75 per cent. of oil is obtained,

which deposits the solid ceresine on cooling. The remainder of the purification is carried out as in the case of ordinary paraffin. If the last traces of colour and odour are to be removed, it is best to use a little blood charcoal. The yield of refined ceresine is about 25 per cent. of the raw material. It is a waxy substance of amber colour, inodorous, with a fine granular fracture, very similar in appearance to yellow beeswax. Its melting point varies over a fairly wide range. In a pure state, it will only darken sulphuric acid to a brown colour. It is quite unsaponifiable, as it consists of hydrocarbons.

All the bodies of this series, being hydrocarbons, do not oxidise in the air, hence their employment in perfumery where it is possible to substitute them for more easily alterable bodies. But they are not so readily absorbed by the skin as the true fats, nor do they fix perfumes so well as vegetable oils do. They are useful in the extraction of perfumes, but are not to be greatly recommended in the manufacture of cosmetics.

ESSENTIAL OILS AND PERFUMES

Essential oils and other types of perfumes extracted from plants will not be dealt with to any extent in this work, as they are fully treated in other special volumes.*

Full information will be found in these special volumes as to the physical and chemical characters of the essential oils, the composition, the presence and development in the plant, and their method of extraction by distillation, expression, maceration, enfleurage, and by the use of volatile solvents. In the works by the authors referred to, distilled aromatic waters, tinctures, and extracts have been described, as well as the principal apparatus used in their manufacture. A few words on terpeneless oils, however, may be of interest. Most essential oils contain, in addition to their real odorous constituents, a certain quantity of terpenes, hydrocarbons which do not contain any oxygen, and which are practically valueless from the odour point of view. They are only slightly soluble in alcohol, and easily oxidise and develop a disagreeable odour. They are, therefore, useless from a perfumer's point of view. Lemon and orange oils contain 90 per cent. or more of their weight of terpenes; bergamot, lavender, geranium, and other oils contain less, but varying quantities of terpenes, and some contain none or only small quantities.

* "Fabrication des Essences et des Parfums," J. P. Durville; "The Chemistry of Essential Oils," E. J. Parry.

The introduction of terpeneless essential oils into commerce was first due to H. Hænsel, who removed the terpenes from various oils, leaving a mixture of practically all the oxygenated constituents which form the odour value of the oil.

Many oils also contain sesquiterpenes, higher boiling hydrocarbons than the terpenes, but which have similar characters and may also be removed with advantage.

The removal of the terpenes and sesquiterpenes is effected by fractional distillation under reduced pressure, but Carbeland considers that a useful terpeneless oil of lemon may be prepared in the following manner. The oil is well shaken for several hours with 45 per cent. alcohol; the oxygenated soluble constituents which are the odour bearers dissolve in the dilute alcohol. The liquid is then allowed to separate, and the terpenes are removed. These can be used in conjunction with citral for cheap soap perfumery or similar purposes. The alcoholic solution is then freed from alcohol by distilling it off, leaving a concentrated lemon oil sufficiently free from terpenes to be used as terpeneless oil.

In practice, however, the terpenes are removed as above indicated by fractional distillation. The yield varies considerably in a given oil. Oil of lemon, on the average, yields about 5 per cent. of terpeneless oil. The terpenes, of the chemical formula $C_{10}H_{16}$ are characterised by a lower boiling point than most of the oxygenated constituents and by a low specific gravity. The sesquiterpenes, of the formula $C_{15}H_{24}$, on the other hand, have a higher specific gravity than the terpenes, and a boiling point which is frequently higher than those of the oxygenated constituents. Both series of hydrocarbons are practically insoluble in dilute alcohol, and have only a very slight odour and a strong tendency to oxidise and resinify under the influence of air, light, and moisture. The numerous terpenes resemble each other closely in odour and taste, so that they have little effect in determining the character of an essential oil. Thus pinene is found in all varieties of turpentine oil, in camphor oil, in coriander, fennel and star aniseed oils, and in many others. Limonene is present in lemon, orange, bergamot, and pine-needle oils. Phellandrene is found in eucalyptus, pine-needle, and star aniseed oils, etc. The terpenes, having but a slight odour themselves, but still a distinct one, tend to mask the odour of the oxygenated constituents. They are far less suitable as a diluent than alcohol, because they are so easily oxidisable; and there is the further

point to be considered, namely, that they are present in very variable amounts in the same type of oil. These variations are due to differences in climate, soil, humidity, greater or lesser sunlight, in the same way, for example, as the wines in different districts vary in alcoholic strength. But with terpeneless oils, these objections disappear. The products are always nearly identical, even when prepared from different years' oils. The principal advantage in the use of terpeneless oils is their solubility in dilute alcohol, which allows the preparation of relatively strong perfumes with weak alcohol.

Further, essential oils gain in delicacy of odour by the elimination of the terpenes. For example, geranium oil, even of the finest quality, is only slightly improved by the addition of otto of rose—the geranium odour still predominates. But a small addition of otto of rose to terpeneless oil of geranium will give it a characteristic rose odour. Italian Neroli oil is not very fine in odour and, when mixed with French oil, lowers its odour value; but when in the terpeneless condition the two oils can be mixed in equal proportions without lessening the odour value at all. Spike lavender oil freed from terpenes has an odour which, although not so fine, approximates to that of genuine lavender. Terpeneless Japanese peppermint oil is nearer in value to the corresponding American oil than is the case with the natural oils, and American oil, well rectified and rendered terpeneless, approximates in odour value to the corresponding English oil. A few simple experiments will show the perfumer the accuracy of these relationships.

The following table indicates the difference in the odour values of the natural and the terpeneless oils:—

Oil.	Strength of Terpeneless Oil.
Bergamot	2.5 times that of natural oil.
Cananga	10-12 „ „ „
Cedar	6-10 „ „ „
Lemon	20 „ „ „
Cypress	30 „ „ „
Abies species	17 „ „ „
Limes	12-15 „ „ „
Mandarine	60 „ „ „
Italian Neroli	2.5 „ „ „
Opoponax	4-5 „ „ „
Patchouli	4-5 „ „ „
Peppermint	1.5-2 „ „ „
Orange	50-60 „ „ „
Rosemary	3-5 „ „ „
Thyme	2.5-4 „ „ „
Balsam of Tolu	3 „ „ „
Juniper	20 „ „ „

We may now direct attention to a few aromatic substances which are of the greatest importance to the perfumer: these are musk, civet, ambergris, vanilla, and mastic. The perfumer uses these without the interaction of any previous industrial treatment of them.

Musk.—The musk deer, *Moschus moschiferus*, is found on the higher slopes of the chain of mountains which traverses Central Asia from the borders of Central Siberia to the termination of the Himalayas (the plateau of Thibet, Tartary and the interior of China, etc.), in regions covered with perpetual snow. This animal, which is very beautiful in appearance, is not horned as are the deer of our own climates. The male, when arrived at the age of puberty, bears, in the centre of the abdomen, between the navel and the organ of generation, a gland imbedded in the epidermal tissues. It is in this gland or "pocket" that the musk as we know it is contained. From the zoological point of view, there are many deer of this family, but only two or three varieties furnish this valuable perfume material, of which the price is very high. There are *Moschus moschiferus*, *M. altaicus*; and *M. sibericus*. Sometimes the deer are hunted with the gun, sometimes caught in traps, when they are deprived of the musk pocket, attached to a small portion of the skin of the abdomen, and this musk pod, as it is afterwards called, is then dried. In the fresh state, the matter contained in the gland is soft and unctuous, but on drying assumes the consistence which allows of granulation into the form in which we meet it in commerce. There are several varieties of musk, the prices of which vary considerably. The principal variety—which constitutes 85 per cent. of the total musk of commerce, is Tonquin musk, which is the most valued of all. The pod is almost spherical, from 1 to 1.5 inches in diameter. The surface which is attached to the muscular tissues is smooth and devoid of hairs, whilst the external surface is covered with hair, resembling a miniature beard, converging towards a central opening. The muscular skin of the pod is easily separated from the skin of the abdomen. It is of a pale to deep brown colour, and within it is found the musk itself. It is a brownish mass, somewhat greasy, but very friable, and when crushed forms grains of small size. The mass is traversed in every direction by a thin pellicle, and quantities of hairs are often met with. The odour is quite distinctive, and almost unsupportable to many people. It is very penetrating and exceedingly persistent. It is only when used in minute quantities

that it becomes an agreeable perfume. Its taste is bitter and sharp. Pods of Tonquin musk weigh from 15 to 40 grams and contain about 50 to 60 per cent. of their weight of true musk. Genuine musk, as met with in commerce, contains about 15 per cent. of moisture and yields 8 per cent. of ash. To water, it yields about 50 per cent. and 10 to 12 per cent. to alcohol. It contains about 2 per cent. of a ketone, muscone, to which it principally owes its odour.

Tonquin musk comes principally from the deer hunted in Tonkin China, Thibet, Mongolia, and Cashmere. Canton and Shanghai are the principal ports of shipment, and the principal markets for it in Europe are London and Paris. A catty, as the package is called, contains about 25 pods, each carefully packed in a kind of silk paper covered with Chinese characters. These catties are about 6 or 7 inches long, 4 inches wide and deep. As many as 2000 catties of 600 grams each have been exported in one year from Shanghai. For some years past a special type has been exported under the name of Yunnan musk. The pods are almost spherical, covered with but little hair, and contain a yellowish musk of very fine odour. There is a Yunnan variety known as "Tamp'i," in which the pods have been deprived of the ring of abdominal tissue found in other varieties. It is generally understood that the contents of these pods have been tampered with. There is a much-valued variety of Tonquin musk known as Blue Skin musk. Here the two or three layers of outer skin have been removed, revealing a membrane of bluish colour, which gives its name to the musk. It is more easily dried and is always treated more delicately in Shanghai than other varieties, and as it contains a greater percentage of actual musk, on account of the removal of some of the skin, it naturally commands a higher price.

Cabardine or Siberian musk has not the same value as Tonquin musk. It is collected on the plateaux of the Altai range, in Central Siberia and in Mongolia, and the exportation until its present disorganisation was always carried on through Russia. A certain amount found its way to China and a certain amount reached the London market, from which sources Europe obtained its supplies. The pods are more oblong than those of Tonquin musk, the under skin is of a dirty yellow colour and very brittle and hard, whilst the upper skin is covered with grey hairs terminating in white points, as though they had been cut with a razor. The opening of the pod is situated nearer the edges than

in the Tonquin-pods. The musk itself is more transparent, soft in the natural state, easily powdered on drying. The pods weigh from 15 to 30 grains and the perfume, although less intense, resembles that of castor. An aqueous extract of this musk gives an abundant precipitate with a solution of mercuric chloride, but this could hardly be relied on as a distinctive test. Assam or Bengal musk resembles Tonquin musk in texture. The pods are usually larger and are frequently attached to pieces of skin of the abdomen. The pairs are of a reddish-brown colour. The perfume is less intense, and rather resembles that of Siberian musk. About 200 pods are packed in small iron or wooden boxes for export. Bokhara musk is hardly a commercial article in Europe. It is rarely met with, and is in the form of small pods about the size of a pigeon's egg. The odour is very weak; only a few hairs of reddish colour are on the skin, and the lower skin is greyish-black.

Apart from the true musk, or product of the musk deer, we may mention the "American" musk, or musk from the musk rat, *Fiber zibeticus*. This substance, not found in commerce to any extent, is the product of a gland attached to a caudal appendix of the animal. It is obtained by cutting up the gland into small pieces and slaked lime—4 grams to each gland—is mixed with the tissues. The whole is macerated in alcohol, and an infusion is thus obtained, after a fortnight's maceration, which is claimed to be at least three times as powerful as a corresponding extract of true musk, and the odour value of which is midway between those of Tonquin and Sumboul musks. Although practically unknown in England, there is said to be an increasing trade in a musk derived from the female alligator. This animal is provided with four perfume-secreting glands, two in the head under the throat, and one on each side of the abdomen. The "musk" occurs as a very thick paste, yellowish in colour, and of a distinctive, penetrating odour which the natives of Brazil call "lizard odour."

The composition of musk varies, even when pure, very greatly according to the age of the deer and the food he has eaten. Besides various mineral salts, it contains astringent substances, cholesterin and ammonium carbonate (the last named probably as a decomposition product). The perfume of musk, so far as is at present known, is due to the presence of small quantities of two ketones of unknown constitution which are present to the extent of from 0.5 to 2 per cent. Of these, the principal is

muskone, a thick, colourless oil of the formula $C_{15}H_{23}O$ (or $C_{16}H_{30}O$), having a powerful musk odour. It boils at 327° to 330° , and may be regarded as the principal odour-bearer of natural musk. This odour is, of course, modified by the gradual decomposition of musk which takes place on exposure to air and moisture, when ammoniacal decomposition products are formed.

Water, as above stated, dissolves about 50 per cent. from musk. The aqueous solution is slightly alkaline to litmus. Absolute alcohol dissolves from 10 to 15 per cent., or, rarely, a little more. Dilute alcohol dissolves more, in proportion to its dilution with water. Ether and chloroform only dissolve a very small amount.

Musk is one of the most important raw materials for the perfume industry. Although in its natural state its odour is revolting for most people, it is, when used in very small proportions with numerous essential oils, able to impart intensity and lasting properties which they lack by themselves. An enormous number of the best perfumes contain musk, but the art of the perfumer is to know how to employ minute quantities which lose their characteristic odour whilst greatly modifying the odour of the other ingredients. Unless careful judgment in this direction is used, the powerful perfume of musk will predominate and overcome all other odours, and the final "bouquet" will not be what was expected. Musk is employed in the form of an alcoholic extract (80 per cent. alcohol). It is well to add a few drops of ammonia to the alcohol.

The Adulteration of Musk.—The high prices paid for musk are an inducement to sellers to adulterate it, especially the Chinese sellers, who are masters in the art of adulteration. It is especially easy for them, as they have the product in its fresh state and the time and opportunity to manipulate it. Sometimes they abstract some of the pasty musk from the pod, sometimes they introduce through the opening in the pod foreign matter which can be mixed with the genuine contents, such as coagulated blood, earthy matter such as powdered ochre, or even lead shot to increase the weight.

When powdering, it is necessary to examine the outside of the pod, in which any cut or tear should at once arouse suspicion. When the pod is opened, the contents should be examined, when particles of lead or sand, if present, may be observed. The pure substance should have a characteristic granular appearance, and when a small fragment is ignited on platinum, no odour of burnt

horny matter should result. A solution obtained by digesting 12 per cent. of musk in distilled water should become turbid on the addition of solution of mercuric chloride, but should not yield more than a minute precipitate (except in the case of Siberian musk). If a copious precipitate results, the presence of ammonium carbonate or Siberian musk is probable. Grain musk is so subject to adulteration that the perfumer should never purchase it except from firms whose integrity is well established. The empty pods have a perfume value, and are dealt in and used for the preparation of second-grade musk tinctures, etc.

The odour of musk is so penetrating and so lasting that any one using it should not touch it with his fingers, but use a spatula or similar contrivance. Equally, it should never be placed on a bare scale pan, but should be weighed into a tared glass vessel.

Camphor, mustard oil, or even solid gold attract and retain the perfume of musk. If one desires, after finishing using musk, to remove the odour from one's hands, it is useful to add a little solution of camphor in alcohol, or a little mustard flour to the water in which the hands are washed, when the odour will be entirely or nearly entirely removed. Artificial musk will be referred to in the section dealing with artificial or synthetic perfumes.

Civet.—Civet is the secretion of a double gland found in both sexes of the Civet cat, which are species of the animal *Viverra*, small, cat-like animals of the tiger species. The glands are situated close to the sexual organs. Two species are principally responsible for the production of civet, *Viverra zibetta*, of Asia, found in India, on the Persian Gulf, etc.; and *V. civetta*, of Africa, found in Egypt, Abyssinia, Nubia, Cordova, and, rarely, in Central Europe. Some of these animals become fairly tame on keeping, others remain somewhat savage, and they are kept in long, narrow cages so that when the secretion is removed from the gland, which is usually done twice a week, the animal cannot turn his head round sufficiently to attack the operator. The animal is often purposely worried and irritated for a short time before the operation, as this causes an increase in the amount of the secretion, which is then placed in empty horns and exported. A small amount is produced in Central America from animals which have become acclimatised there.

Fresh civet is a yellowish mass, soon becoming brown on the surface, of the consistence of butter. Its odour may be described as faecal, and is intensely disagreeable, more so than musk, which

it resembles. It is, like musk, only in an extremely dilute condition that it can be used, not only as a fixative, but to modify other odours.

Sack quite recently isolated a ketone from civet which is the principal, or one of the principal, odour-bearers present. He has termed this Zibethone. It is a liquid boiling at 342° . Skatole is also present, and is largely responsible for the faecal odour of civet.

Castor.—This body is now so little employed in perfumery that it need only be referred to. It is a secretion obtained from the beaver, having an odour recalling that of dilute musk with a suggestion of birch tar and pine resin.

Ambergris is a valuable raw material of perfumery, found in masses of various sizes floating on the sea. It is probably the product of disease of the whale *Physeter macrocephalus*, a cosmopolitan animal, but principally met with near Madagascar, Surinam, Japan, etc. A certain amount of ambergris is obtained by hunting the whale and extracting the ambergris before it has been rejected by the animal. It is generally more profitable to seek for floating ambergris in stormy weather, when the lumps are washed up towards the shore. It occurs in irregular, opaque, friable lumps of pronounced waxy appearance. The colour is grey to brownish, and in the smaller pieces the variations in shade are characterised by a fairly regular stratification. It is nearly tasteless, and softens at 25° to 30° . It can easily be pierced by a needle, an operation which is useful in controlling the purity of the substance. When the needle is withdrawn, it should have nothing adhering to it, whereas if resinous matter has been added, some of the substance sticks to the needle. The fracture is fine, granular, and slightly laminated. The odour is characteristic, but weak, reminding one somewhat of benzoin. It is very persistent and develops to a marked extent by a rise in temperature. Ambergris melts in boiling water, forming an oily layer floating on the surface. It burns without leaving more than traces of ash. Its specific gravity varies, usually, between 0.900 and 0.920, and its melting point is about 40° . Large pieces of ambergris should be regarded with suspicion. They often contain the bones of cuttlefish and other sea animals.

Ambergris is easily dissolved by ether and fatty oils, leaving very little residue. It is less soluble in alcohol, even at an elevated temperature. Various grades of ambergris exist. The most appreciated is of a clear grey colour, brown or white varieties.

being less esteemed. Being very expensive, it lends itself to adulteration, one of the commonest forms being the addition of gummy or resinous particles of similar appearance.

Rihan in 1912 examined the crystalline substance found in ambergris by Pelletier and Caventou, which is known as ambreine. He found that it was not a single substance, but on purification he obtained pure ambreine melting at 82°. Further than this, no other substance, except, perhaps, benzoic acid, has been identified in this perfume material. Ambergris should be stored in glass or metal vessels kept well corked. In preparing alcoholic tinctures of ambergris, greater strength will be obtained if a small trace of potassium carbonate be mixed with the ambergris and allowed to stand for a little while before the alcohol is poured in. Ambergris is not so much an actual perfume substance as, like musk and civet, to fix and improve other perfumes which are delicate and fugitive.

Vanilla.—This substance is the fruit, properly dried and cured, of a climbing orchid, a native of Central America, and which has been acclimatised in Bourbon (Réunion), Jamaica, the Seychelles, Java, Tahiti, Mauritius, and the Fiji Islands. There are two species in cultivation for the production of this spice, *Vanilla planifolia*, the true Mexican vanilla, and *V. pompona*, the West Indian vanilla. At the end of the flowering, a long, thin, unicellular pod is formed which does not ripen the first year, and which attains a length of as much as 8 to 9 inches. The pods are collected before they are quite ripe, dried by various methods, and cured either in the sun or by artificial heat and packed in bundles ready for delivery to users. Whilst the flowers in their natural state are freely fertilised by bees, etc., the cultivated plant is not so fortunate, and hand fertilisation has invariably to be resorted to. The immature pod or bean contains a milky juice of bitter taste, which is probably responsible for the toxic effect on consuming them. On drying and curing, this latex is converted into a semi-solid, brown mass, almost black, which contains the flavouring principles of the bean. If allowed to reach maturity on the plant, the pods open and eject their contents. This is, partly, the reason why they are gathered before ripening. When gathered, they are exposed to the sun, which soon dries the outer skins. They are then exposed in heaps in linen or woollen cloths, for example, sprinkled with water, and again dried either by the sun or by artificial heat, the pods being continually shaken backwards and forwards. The

Pods turn brown and the latex is converted into an aromatic, pasty substance. An experienced workman knows when to stop the process at the right time so as to prevent a too energetic fermentation spoiling the earlier results of the process.

In certain districts, Réunion, for example, the pods are steeped for about twenty seconds in water at 90°, heaped up, and left to dry by natural heat. In this case, the operation is stopped at a definite time after the outer coat has become brown. The cloths are opened, and the pods turned out on tables, where they finish the drying process. They are then sorted out according to their lengths, tied in bundles of about 60, and packed in tins of 20 bundles. Good quality vanilla has a dark brown colour, with a thin skin, greasy to the touch, easily bent, and curved at the ends. The pods are flat, striated in the direction of their length, from 4 to 9 inches long, and about $\frac{1}{4}$ to $\frac{1}{3}$ inch in breadth. The matrix in which the numerous black seeds are imbedded should be very abundant in quantity and very aromatic in quality. A pod which is broken and empty is valueless.

Placed in well-closed receptacles, and kept at a temperature of 28° to 30°, vanilla of good quality (except certain types) becomes covered with a white, crystalline crust, very delicate in appearance, and very sweet in odour. These crystals are pure vanillin. Many lower qualities become similarly coated, and occasionally one meets with cases where low-grade vanillas which will not "crystallise" are treated with an alcoholic solution of either vanillin or benzoic acid, to simulate the natural crystallisation. Vanillin, the principle which gives most of its odour to the bean, is, chemically, methyl protocatechuic aldehyde. It exists together with a number of other unknown aromatic substances, which together impart to the vanilla bean its characteristic odour and flavour. For this reason, artificially prepared pure vanillin does not completely reproduce the odour and flavour of the natural bean.

The aromatic portion of vanilla is soluble in fatty and essential oils, as well as in alcohol. Sometimes one finds in commerce exhausted vanilla beans which have been smeared with a thin layer of balsam of Peru, and then dusted with benzoic acid, so as to give them some resemblance to the genuine article. But if one presses these beans lightly between two sheets of paper, the latter become stained at once, thus revealing the adulteration. Some poor-looking beans are doctored in Mexico by giving them a coating of a dark-coloured oil.

The contents of the pod contain from 0.5 to 3 per cent. of vanillin, together with various resins, fatty oil, sugar, etc., etc.

The tins in which vanillas are packed should be hermetically sealed by soldering them. Each bundle should be wrapped in a sheet of tin foil, sufficiently thick to preserve them from moisture. If they are kept in too warm a place, the aroma is weakened, whilst excess of moisture causes vanilla to mould and take on an unpleasant odour which cannot be got rid of.

Mexico was the first country to produce vanilla beans, and it is only sixty years ago since they were first produced in Réunion, and later still in Ceylon, Java, and other districts where their cultivation now takes place.

There are several varieties of Mexican vanillas, the ordinary long beans, obtained by the cultivation of *V. planifolia* being the usual high-grade Mexican beans. They are about 5 to 8 inches long, sometimes even 10 inches, and about $\frac{1}{4}$ inch wide, striated, curved at their ends, sticky, and deep brown in colour. These are the high-grade, frosted beans.

Occasionally one meets with the wild fruits, naturally fertilised, which are shorter, and are obtained from the same plant as the former, but in its wild condition. The colour is paler and the pod is drier and does not possess nearly so strong an odour as the cultivated bean. These beans do not "frost" or crystallise. Vanillons, or pompon-vanilla, are large pods obtained from *V. pompona*. They are not nearly so delicate in aroma as the other beans: their odour rather resembles a mixture of vanilla, balsam of Peru, and Tonquin beans. The beans reach a length of 4 to 6 inches, are somewhat thin, and are soft, brown, and sticky and somewhat reticulated and mixed with over-ripe empty pods.

Bourbon vanillas, although shorter than the best Mexicans and more reticulated, yield quite as good results from the perfumery point of view. Adulteration of vanillas consists chiefly in the admixture of inferior beans with those of a better quality, or of treatment of diseased beans with balsam of Peru. The perfume and the sticky feel of such beans easily indicate such an admixture. The most inexperienced user ought to be able to recognise by their appearance beans exhausted by alcohol and which are fraudulently "reconditioned."

Vanilla is used in perfumery in the form of alcoholic tinctures. Unfortunately, these tinctures, which are most useful when used in small quantities, are so deeply coloured by the pigment of the

beans, that they must be used with discretion. This is not the case with artificial vanillin, which is colourless, and can be used for any type of cosmetic preparation.

VARIOUS SUBSTANCES FREQUENTLY USED IN PERFUMERY

It is only necessary to refer briefly to a number of other substances, mineral and organic, natural or artificial, which are of some importance in perfumery, although they are not part of the perfume properly so called, nor of the actual soap or essence in which they are used. The following bodies include a few which may be regarded as colouring matters.

Talc or Steatite.—This substance is essentially a silicate of magnesium, a mineral matter occurring in laminated masses, varying in colour from a greyish-green to a pure white. It is found in the Alpine regions, especially in the Tyrol^{ese} Alps, in the Southern districts. It has a specific gravity of 2.74. The fragments are micaceous, almost transparent, and of a somewhat greasy nature to the touch. When finely powdered, it is, in the best qualities, pure white and soft and non-gritty to the touch. This is the quality which is used in perfumery, not only for the preparation of face enamels, etc., but as an addition to soaps and various powders, pomades and cosmetics. Faintly perfumed talc is the powder sold as "glove powder." In all cases the finest and whitest powder is necessary, and where rouges and enamels are concerned, very special qualities are required, which will be referred to later.

Lead Carbonate.—The perfumer is warned against the use of lead carbonate, or white lead, since it is a strong poison and should never be employed in perfumery. Its virtues, without its poisonous properties, may be supplied by bismuth subnitrate.

Bismuth Subnitrate or Enamel White.—This substance is a basic nitrate of bismuth combined with water. It forms a light, white powder, without odour or taste, practically without any crystalline form at all. When heated to 100°, as is usual when required for perfumery purposes, it loses all trace of crystalline structure and becomes an impalpable powder. It is still further improved by lixiviation by water, when all coarse particles are removed. It is somewhat expensive, which is the only reason that a substitute for it is sometimes sought. Amongst the

substitutes for this substance which are not toxic, like white lead, is zinc oxide.

Zinc Oxide.—This substance, of the formula ZnO , is of a whiteness which leaves little to be desired, and it is not particularly toxic. Further, it does not blacken under the influence of sulphuretted hydrogen, which is given off on burning ordinary lighting gas, which causes discoloration with both white lead and bismuth subnitrate. As will be seen later, it is not wise that face enamels and similar preparations should be used except where necessary, for example, in the theatrical profession. The property of not blackening under the influence of burning gas has, for this purpose, caused zinc oxide to be duly appreciated by manufacturers of this class of compound. This is also true of barium sulphate.

Barium Sulphate, or "Blanc-fixe."—This substance has the formula BaSO_4 . It is quite harmless when pure and washed free from barium chloride, which is poisonous. It is a good white powder, not quite so good as zinc white, but perfectly stable and unalterable chemically. Calcium carbonate, more or less pure, forms the basis of the cheaper face enamels, and, being quite harmless, enters also into the composition of tooth powders and similar preparations. For such preparations, it must be in the finest state of sub-division, which is usually attained by careful levigation.

Silver Nitrate (caustic).—This substance, AgNO_3 , has never been effectively replaced as a dye for white or grey hair. It is, therefore used as a disguise, and although its use is not recommended, it should be noted that pure silver nitrate, prepared by dissolving metallic silver in nitric acid and recrystallising the nitrate so obtained, is frequently adulterated, especially when in the form of sticks, which are obtained by pouring the melted salt into appropriate moulds. To this form of nitrate of silver, nitrate of potassium is frequently added, sometimes legitimately, when it is described as "mitigated caustic," and sometimes fraudulently without such description. The fracture of pure silver nitrate is crystalline, but with even small quantities of potassium nitrate, the fracture is conchoidal. When pure, it is very easily soluble in water, but very slightly soluble in ether, except when alcohol is added, when its solubility is increased. It dissolves in ammonia without coloration or precipitate. Its aqueous solution is neutral to litmus. A 10 per cent. solution in water should not become turbid when mixed with four times its volume of dilute

sulphuric acid, even at the boiling point. And if such a solution be treated with excess of hydrochloric acid, all the silver is precipitated and the filtrate should leave no residue on evaporation. The mere presence of organic matter (dust, etc.) will not darken nitrate of silver, except in the presence of light, when reduction will take place, with consequent blackening.

To preserve the sticks of silver nitrate they must be wrapped in non-transparent black paper, or stored in dark blue or amber bottles. If allowed to come into contact with the skin, silver nitrate causes a dark stain, which is deeper according to the dampness of the hand. If the stains are moistened with a solution of potassium iodide, and then, in a few moments, washed with water, they will be removed.

Glacial Acetic Acid.—This acid has the formula $C_2H_4O_2$, and is used to some extent in perfumery. Being of an antiseptic nature, and capable of dissolving most essential oils to some extent, it is a useful base for the preparation of toilet vinegars and acid smelling salts. But it should be of the purest quality and be quite free from empyreumatic matter, which is present in many commercial samples. It is a colourless liquid, of characteristic odour and taste. When it is of 100 per cent. strength it solidifies between $+5^\circ$ and $+10^\circ$ into a crystalline mass, and melts at $+16^\circ$. Its specific gravity varies according to its actual strength. At 100 per cent. it is 1.060, whilst when weaker, it will increase to 1.070. At about 50 per cent. strength its specific gravity is again 1.060. So that its strength cannot be determined except by analysis. Acid of 84 per cent. strength will dissolve 1 per cent. of lemon oil without turbidity, which is not the case with weaker acids. If the acid be saturated with sodium carbonate, empyreumatic matter can at once be detected by its odour. If 1 volume of the acid be diluted with 2 volumes of water, and a few drops of solution of potassium permanganate are added, the latter will rapidly be decolorised if empyreumatic matter be present.

Acetic Ether.—Acetic ether, $C_2H_5 \cdot CO_2 \cdot C_2H_5$, is a clear, colourless, volatile liquid, of a refreshing odour, recalling that of acetic acid, but much more fruity. Its specific gravity is 0.900 to 0.904. It boils at $74-76^\circ$. It is slightly soluble in water, and soluble in all proportions in alcohol. This ether liberates free acetic acid under the influence of sunlight; to render it neutral again, it should be shaken with sodium bicarbonate and filtered.

Phenol.—This acid body is derived from coal tar and has the

formula C_6H_6O . It is a powerful antiseptic and is sometimes used as such in the manufacture of antiseptic washes and tooth-powders. The substance used is, of course, the pure acid, which crystallises at the ordinary temperature in long needles. It is colourless, and has a burning taste and a strong penetrating odour, which is not, however, very lasting. Its melting point varies according to its degree of purity, and when melted it forms an inflammable liquid. It is soluble in water, but more so in alcohol, ether, and glacial acetic acid.

Starch.—This important raw material is a carbohydrate of the empirical formula $(C_6H_{10}O_5)_n$, and is met with in nearly every portion of most vegetable tissues. Commercially, it is extracted from wheat, maize, potato, and the roots of numerous tropical plants, such as arrowroot. Rice starch is the most usual variety employed in perfumery. Wheat starch as met with in commerce is usually too lumpy for use in perfumery—that is, for the preparation of toilet powders. It must be ground to a very fine powder before being used. Rice starch is nearly identical with wheat starch (except that it is, perhaps, not quite so adherent to the skin). Perfumers usually employ only these two varieties, and seldom use potato starch, which is too dense and impure, and lacks that special whiteness which characterises powders prepared with rice and wheat starch. Starch “cracks” by the pressure of the hand. If it lacks this character, it is certain that it contains excess of moisture. To get it into condition, it must be completely dried by artificial heat. A good quality pure starch should not contain more than about 15 per cent. of its weight of moisture. Mineral adulterants are detected by incinerating the starch, and examining the ash in the usual manner.

Glycerine.—Glycerine, $C_3H_5(OH)_3$, when in the purest condition in which it can be obtained, is a colourless, odourless, syrupy liquid of specific gravity 1.260. It is soluble in all proportions in water and alcohol, but insoluble in chloroform, petroleum ether, and fatty oils. It is very hygroscopic and will absorb 50 per cent. of its weight of water from the atmosphere. Its boiling point is about 290° . It is, however, carried over by a current of steam, in quantities depending on the pressure of the steam. Heated considerably above its boiling point, it decomposes and gives off acrid vapours of acrolein. Neither sulphuric acid nor caustic alkalis in the cold effect any alteration in its character. Glycerine is prepared by the saponification of fatty bodies. The best quality results from saponification by superheated steam.

The aqueous solutions of glycerine, freed from suspended fatty acids, are evaporated, either at normal pressure, or *in vacuo*. The crude glycerine is purified by vacuum distillation. It is unfermentable, and practically anhydrous when of specific gravity 1.260. But when pure it has a tendency to irritate the skin, on account of its hygroscopic properties. When diluted with 40 to 50 per cent. of water it ceases to be hygroscopic. When heated with dilute sulphuric acid it should not evolve any odour of butyric acid. Impurities such as lime or sulphuric acid are detected by the usual analytical tests. Glycerine reduces silver nitrate, chromic acid, and bichromate and permanganate of potash, and should not therefore be used in conjunction with these bodies.

COLOURING MATERIALS

The principal colouring matters used in perfumery are blue, yellow, black, brown, red, green, and violet.

Indigo is the only natural blue colour which is used, and it is employed in the following manner: 20 grams of finely powdered indigo are dissolved in 200 grams of sulphuric acid (66 per cent.) in a glass vessel, until effervescence has ceased. The product, known as Saxe blue, must be neutralised by adding calcium carbonate until no further evolution of gas takes place, when the mixture is allowed to stand and is then filtered. To the liquid colour so obtained, 25 per cent. of alcohol is added in order to preserve it. An indigo paste, already prepared, can be purchased which, on dissolving in 80 parts of water, yields a powerful colouring matter, ready for use. Such a solution gives a good blue colour to 1000 times its volume of liquid.

Prussian blue, and the various synthetic blues, such as methylene-blue, are not recommended for use in perfumery on account of their possibly toxic effects.

There are numerous yellow colours used in perfumery. One of the most stable is that from saffron, *Crocus sativus*. This is reduced to a form suitable for colouring purposes by boiling 200 grams of saffron in 500 c.c. of water, and decanting the yellow liquid; the residue is again boiled with 1000 c.c. of water and to the united aqueous extracts are added 100 c.c. of alcohol. The residue from the aqueous extracts is then treated with 900 c.c. of alcohol and the alcoholic extract is mixed with the aqueous extracts previously obtained; the mixture is a rich

yellow ready for use, so that 1 part gives a good yellow colour to 1000 parts of colourless material.

Carthamus tinctoria, sometimes known as bastard saffron, gives a good yellow colour when extracted by alcohol, but as it has a powerful purgative action, it is not usually employed in perfumery; the objection is, of course, purely sentimental. The use of aloes, which gives a fine yellow colour, is in the same category. Turmeric (*Curcuma tinctoria*) gives a good yellow solution, which is not very stable towards sunlight. Its taste and odour are also against its general employment. Fustic (*Rhus cotinus*) yields a fine orange-yellow colour, changed by alkalis to a purple-red. It is, however, somewhat toxic and must be used with care. Bixine is sometimes, but not often, used to colour oils, both fatty and hydrocarbon. Quercitrin, from quercitron wood, gives a golden-yellow with alkalis and a greenish-yellow with acids. It can only be used externally. Synthetic coal-tar yellow need not be discussed here.

Caramel.—This product is largely employed in perfumery, usually in alcoholic solution, and also in fine soap manufacture. It can be used to give a colour varying from amber-yellow to deep brown. Mixed with indigo or with chlorophyll, it gives all shades of green, from an olive to a "dead-leaf" green. Mixed with saffron and indigo carmine, it gives the lighter shades of apple-green. When pure, caramel, if used with discretion, is of great value in perfumery colouring. It is a thick, syrupy, brown liquid, obtained by heating crude cane- or beet-sugar, or glucose, which has been obtained by the hydrolysis of starch, to a high temperature, usually with the addition of a little caustic soda. It is a viscons liquid, which is semi-solid on cooling to a low temperature, unless a small quantity of water is added so as to keep it in a liquid condition. Caramel has a powerful colouring capacity, and is absolutely innocuous. It is advisable, however, to use a caramel prepared with sufficient care to ensure freedom from traces of arsenic, which may be present when it is manufactured from glucose with impure sulphuric acid.

Black Colours.—These colours are hardly ever used except for the preparation of eyebrow pencils and certain other cosmetic preparations. Pure charcoal or ivory black in the solid form, or "Chinese Ink" in the liquid form, are practically the only varieties employed. Brown colours are obtained by mixing yellows with caramel, or with alcoholic extracts of gum benzoin,

tolu, or storax—or sometimes with metaphenylenediamine, which is toxic and should never be used. Mineral colours of the iron oxide type are used to a small extent as brown colouring matters.

Red Colours.—Red colouring material is principally employed for powders, pastes, soaps, and liquid dentifrices, enamels, creams, and rice powders. The principal material used is cochineal, and its active principle carmine. A mixture of cochineal is used to colour liquid dentifrices, and is prepared as follows:

Powdered cochineal	1 part.
80 per cent. alcohol	10 parts.

The mixture is macerated in a closed vessel for ten days with occasional shaking, and is then decanted, the mass pressed, and the liquid filtered. The exact shade of red can be modified by suitable additions. A golden-red results from the addition of a little tincture of benzoin, an orange-red by the addition of a little citric acid; a violet-red by a little caustic alkali or a small quantity of indigo carmine. Trial mixtures will rapidly give the desired quantities for any given shade. Powdered carmine is usually used to colour powders and tooth-pastes. For powders, the quantity varies from 0.25 to 1 per cent., and for pastes and creams from 1 to 2 per cent. If the slightly violet shade needs correction, a little eosin can be added. Carmine is prepared by treating powdered cochineal by sodium carbonate and alum, or similar mixtures, and extracting by well-recognised chemical processes. A good "liquid carmine" is given by the following formula:

Powdered cochineal	10 grams.
Powdered alum	2.5 "
Cream of tartar	2.5 "
Distilled water	150 "

The water is heated to boiling point, and the cochineal added; after five or six minutes' boiling the alum and the cream of tartar are added, the whole is well stirred, and allowed to cool. The filtered liquid gives the base for numerous shades, from pale to the most intense red.

Red sandalwood, or red Sanders wood, is used as a tincture, prepared by macerating 1 part of the powdered wood with 5 parts of 80 per cent. alcohol. For colouring liquid dentifrices, use 3 per cent. of this tincture. The colour is very stable.

Logwood, which contains hæmatin, gives a good red colour,

but it is not very soluble in water. Dilute acids turn it a yellow, and alkalis a purple-red colour. It must be prepared in a perfectly neutral condition, and with strong alcohol as the solvent. Hæmatin can also be purchased already prepared. To extract the hæmatin, the powdered wood is triturated with ammonia, and the pasty mass exposed to the air until the smell of ammonia has disappeared; oxidation then proceeds and the oxidised hæmatin can be dissolved out as a colouring agent.

The extract from *Anchusa* root furnishes a red colouring matter which is soluble in alcohol, fatty oils, hydrocarbon oils, etc. This colour can therefore be employed for oils, pomades, etc., and furnishes shades varying between pale rose and deep purple. One hundred grams of the powdered root are moistened with 10 c.c. of distilled water containing 1 gram of citric acid. The mixture is allowed to stand for several hours, and then 80 per cent. alcohol is added. In eight days, the mixture is filtered and the liquid is then ready for use. Alkannin, the colour-principle of *anchusa*, can be obtained commercially.

Orchil is a colouring matter extracted from *Roccella tinctoria*, and is principally employed in colouring alkaline hair lotions. The red shade is deepened by acids and turned to a violet-red by alkalis.

The extract from *Bixa orellana* contains several colouring matters, both yellow and red. The principal of these is a red colour known as bixin. It is used in alcoholic solution to give golden-red effects.

Synthetic reds are remarkable for the wide variety of shades obtainable. These are generally less expensive than the natural colours, and require very simple preparation. They only require to be dissolved in water, or in a mixture of water and alcohol, to the strength of, say, 1 per cent., and they are then ready for use. One c.c. of such a solution is usually sufficient to colour a large volume of liquid. It is, however, necessary to take into account the chemical properties of the colour, especially its behaviour towards acids and alkalis. Two principal classes of these colours exist, the basic colours and the acid colours. Basic colours are usually precipitated by tannic acid, whilst acid colours are not. The manufacturer of such colours usually describes his colours in this respect, so that the user knows what he has to deal with.

Synthetic reds are so numerous that it is impossible here to enumerate them. Eosines, erythrosines, Bengal red, Bordeaux red, fuchsines, and others are amongst the most generally used

varieties. The cosines, of which there are many shades, give an exceedingly fine "rose-cylantine" shade. It is fairly resistant to light and to acids. In alcoholic solution, cosine is fluorescent, giving a green colour with reflected light. By using the potassium compound, this fluorescence is obviated.

Green colours are usually obtained by mixing blue and yellow shades, frequently, however, chlorophyll, the natural colouring matter of plants, is employed to colour liquids green. Saffron-yellow and indigo furnish good green shades, such as apple-green and "vert.pré." Indigo and caramel give olive-green and "dead leaf-green." Chlorophyll-green is of a very fine shade. It is, however, easily decomposed by light, and has a tendency to form deposits unless the amount of alcohol present is sufficient to keep it in solution. The plants employed for the preparation of chlorophyll are spinach, nettles, lemon-grass, etc.

It can be obtained by boiling the leaves with alcohol, pressing the mass, filtering the liquid, and recovering the alcohol, or by using the substance in the alcoholic solution. Guillemaire and Lecourt treat spinach leaves with a weak solution of soda. This dissolves out the chlorophyll, and the excess of soda is neutralised with acid, leaving a neutral solution of the chlorophyll.

It is often, however, desirable to purchase the colour just in the form in which one wishes to use it, and one can purchase such colours of all shades and concentrations, relying on the quality being of the best, and so avoiding all risks of one's own unskilled manufacture.

A synthetic green, known as malachite green, is useful for some purposes, but its colour is fugitive in the presence of alkalis. Various artificial greens can be obtained which are not affected by light.

Violet colours are obtained by mixing reds with blues. They are, however, not often employed except for lilac extracts. A synthetic lilac can also be used for this purpose.

CHAPTER II

SYNTHETIC PERFUMES

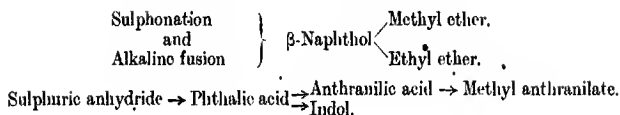
THE PRESENT CONDITION AND FUTURE OF THIS INDUSTRY

THE use of synthetic perfumes has steadily increased of late years. Since the recent war, there has been a feeling of unrest as to the future of the manufacture and use of these products. M. Justin Dupont has, as one of the leading exponents of the industry, dealt with the subject with great precision, and has expounded the rôle of the synthetic in a very lucid manner. He has reviewed the producing countries and the consuming countries, indicating the future possibilities of the industry in France. The following extracts from his published work will be read with interest.

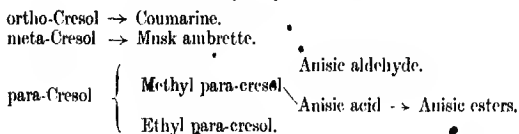
"Synthetic perfumes are never delivered to the consumer of perfumes as such. They are raw materials which require employment by an artist, the perfumer. Associated with natural perfumes of vegetable or animal origin, they enter into the composition of numerous products of industry and of the perfumer's art, such as floral extracts, toilet waters, lotions, perfumed soaps, face powders, cosmetics, dentifrices, etc. Some of these products are specially employed in flavouring articles of food, such as vanillin, which is used for biscuit, chocolate, and confectionery manufacture. Since the war, or before, for that matter, one has been accustomed to read that synthetic perfumes belonged to the category of 'German rubbish.' This, of course, involves a double mistake. First, many of the synthetic perfumes were not discovered in Germany, but in France. Secondly, they are not necessarily coarse, common perfumes. It is true that some of them have a powerful odour bordering on the noxious, but this can be obviated by judicious admixture, but many of them possess so fine an odour that perfumers who are masters in their art have judged them worthy of entering into the most elegant compositions. Like its older sister, the coal-tar dye industry, that of synthetic perfumes has grown side by side

with the discoveries of research workers in the laboratory. It has profited largely by the extraordinary advances in organic chemistry during the past forty years. Forty years ago, one could produce artificial oil of almonds (benzoic aldehyde) and oil of winter green (methyl salicylate)—both French discoveries, the former due to Grimaux and Lauth, the latter to Cahours—and also a few artificial fruit ethers, and that was all. To-day large numbers of natural perfumes have been reproduced artificially, and new compounds have been discovered which have allowed perfumers to reproduce, with extraordinary fidelity and intensity, such perfumes as those of heliotrope, lily of the valley, lilac, and cyclamen, which no process of extraction had been able adequately to separate from the respective flowers. During the past few years, thanks to the use of new methods of manufacture evolved by men of science in their laboratories, there has been a large harvest of discoveries which have made this branch one of the most attractive as well as one of the most prosperous of the chemical industry. New discoveries have been made both in purely scientific laboratories as well as in works laboratories, chiefly in the latter. Too much stress cannot be laid on the entire and absolute dependence of the chemical industry on pure scientific chemistry. The outlets for synthetic perfumes are numerous: they increase, so to speak, from day to day. It would hardly be an exaggeration to say that the introduction of synthetic perfumes has played a part, somewhat modest, perhaps, in the furtherance of social progress. There has been an enormous increase in the consumption of perfumes as a result, and a luxury, hitherto reserved for the richer classes, has been democratised; and the development and consumption of perfumery go, to some extent, hand in hand with practical hygienics. Synthetic perfumes, placing at the disposal of the perfumer very high odour values at moderate cost, have enabled him to produce perfumes at very low prices which have immediately found a new *clientèle*. Another happy result has been achieved, for, side by side with the synthetic perfume, the consumption of natural perfumes has increased, because the synthetic has not supplanted the natural, but has allied itself with the latter, and so produced new odour combinations. In general, a synthetic perfume should not be used alone, because, as in music, it strikes a single definite note and does not constitute 'harmony.' There is, perhaps, an exception in such a case as the application of vanillin to the flavouring of confectionery, etc."

IV. NAPHTHALENE DERIVATIVES



V. CRESOL DERIVATIVES



VI. DERIVATIVES OF VEGETABLE ESSENTIAL OILS *

From	Product.
Turpentine	Camphor, Terpinol and its esters.
Lemon-grass oil	Citral, Ionone and its isomers and homologues.
Caylon-citronella oil	Geraniol and its esters.
Java citronella oil	Geraniol and citronellal.
Geranium oil	" Rhodinol " (?).
Palmarosa oil	Geraniol and its esters.
Camphor oil	Safrol \rightarrow <i>iso</i> Safrol \rightarrow Heliotropine.
Aniseed oil	Anethol.
Clove oil	Eugenol \rightarrow <i>iso</i> Eugenol \rightarrow Vanillin.
Rosewood oil	Linalol and its esters.
Linaloe oil	
Shiu oil	
Syrax	Cinnamic alcohol.

The above table is by no means complete; a limited number of synthetics are included, all of which are of well-recognised constitution, known and described, often as the subject matter of patents, and all matters of common knowledge. Many others exist, often of great interest, which have not been described. If the list of patents taken out during the past twenty years be consulted, not many will be found relating to perfumes. Never, however, has scientific research in this domain been more active than during this period, and new bodies of the greatest interest have been discovered. But inventors have, in general, preferred to run the risk of guarding their discoveries as trade secrets than trust them to the often too illusory protection of a patent.

Turning again to the well-known products, especially those which may be said, considering the size of the industry, to be

* In this category the products are improperly called "synthetics." They are either natural isolates, or, in a few cases, artificial, or partially synthetic bodies.

manufactured on a large scale, we have, amongst bodies produced from coal tar: vanillin, coumarin, artificial musks, benzoic aldehyde, benzyl acetate, and anisic aldehyde, for example; amongst those produced from constituents of essential oils: vanillin, heliotropine, ionone and terpineol, for example.

Certain difficulties have hitherto been encountered in manufacturing benzoic aldehyde and the benzyl esters, owing to trade conditions and the German dye industry being almost a monopoly. But these are now being removed, and practically all synthetics, which were at one time largely a German industry, are now being made in France and England.

DESCRIPTION OF SYNTHETIC PERFUMES

Taking the word "synthetic" as including artificial substances produced by methods other than synthetic, and also isolated aromatics, we may divide them broadly into the following three classes:

(1) Substances obtained by extraction from natural perfume material, either by chemical or physical processes, such as anethole, citronellol, menthol, and safrol.

(2) Substances obtained by synthetic or other chemical reactions which reproduce the odours of a given constituent of a plant, such as coumarin, heliotropin, and vanillin; or those obtained by mixing various bodies, which may include any or all of the classes mentioned under (1) and (2), for example, artificial jasmine and neroli oils.

(3) Chemical products prepared artificially which either constitute an entirely new perfume, or imitate, but are not identical with, natural perfumes. Such, for example, are neroline, which imitates but is not identical with, Neroli oil; mirbane, which imitates the odour of almonds; and the artificial musks, which imitate, but differ chemically from, natural musk.

1.—ISOLATED AROMATICS

Anethole.—Anethole, or *isoestragol*, is methyl-*para*-oxypropenylbenzene, of the formula $C_{10}H_{12}O$. It is the principal constituent of the oils of aniseed, star-aniseed, and fennel, whence it can be extracted by fractional distillation, or by centrifuging the

frozen oils. Anethole is a colourless, crystalline solid melting at 22–23° and boiling at 233–234°. Its specific gravity at 25° is 0.985. It is used principally in the preparation of aniseed flavours for very fine products.

Camphor.—Camphor, $C_{10}H_{16}O$, is the solid constituent of camphor oil, the distillate from the wood of the camphor tree, *Laurus camphora*. It is not identical with Borneo camphor, or borneol, and is sometimes described as Laurel camphor to discriminate it therefrom. The Chinese and Japanese camphor, which furnishes the bulk of the world's supply, contains a number of impurities, so that it has to be refined in Europe. Purified camphor forms a solid, tenacious mass, fairly transparent, difficult to break, granular and crystalline and volatile at the ordinary temperature. It melts at 176–176.5° and boils at 205–207°. It sublimes without decomposition. Its odour is characteristic and its taste bitter and burning, but eventually leaving a fresh and not unpleasant sensation in the mouth. When moistened with alcohol, it loses its tenacity and is easily powdered. On cutting with a knife, it gives a clear, brilliant section. It is only slightly soluble in water, to which it communicates its characteristic odour and taste. It is very soluble in alcohol, ether, and other organic solvents. It is only used in perfumery to a very small extent.

Carvaerol, $C_{10}H_{14}O$, is the principal constituent of Spanish thyme oils and of several allied oils, such as origanum oil. It can be extracted from these oils, or can be made artificially by treating carvone with potash, or sulphuric or phosphoric acids, or by heating camphor with iodine. It is a colourless, syrupy liquid, solidifying in the cold and turning brown on keeping. It melts at +1°, boils at 236°, and has a specific gravity 0.981 at 15.5°. It has a sharp, "antiseptic" odour, and is only rarely used in perfumery.

Carvone, sometimes termed carvol, $C_{10}H_{14}O$, is the characteristic odour-bearer of oils of caraway and dill, in which it exists to the extent of about 50 per cent. It can be extracted by means of sulphuretted hydrogen, which gives a crystalline compound with this body, which can then be decomposed by caustic soda, with the regeneration of carvone. It is a colourless oil, solidifying at low temperatures and having a characteristic odour of caraway. It decolorises slowly on keeping. Its specific gravity is 0.964, boiling point 224°. It is soluble in 20 parts of 50 per cent., 2 parts of 70 per cent., or in all proportions

of 90 per cent. alcohol. It is used in the manufacture of liqueurs. The product known in commerce as carvene is identical with dextrolimonene (mixed with some levulimonene), and is also known as light oil of caraway, or caraway chaff oil. It is the waste product of the manufacture of carvone from caraway oil, and as it contains a little carvone, it has a slight caraway odour. It is used for soap perfumery.

Cineol (also known as eucalyptol) is the principal constituent of eucalyptus oils or the medicinal variety, and of oil of eajaput. It is a powerful-smelling oil, of the formula $C_{10}H_{18}O$, solidifying at low temperatures and melting at $+1^{\circ}$. Its specific gravity is 0.930 and it boils at $176-177^{\circ}$. It is extracted from eucalyptus oil, but is used to only a very small extent in perfumery.

Citral.—Citral or geranial, $C_{10}H_{16}O$, is found in numerous essential oils, but principally in oil of lemon-grass, which may contain up to 85 per cent. of it. It may be obtained in a fairly pure state by fractional distillation in a vacuum. The fraction distilling at $115-120^{\circ}$ at 20 mm. pressure consists mainly of citral, and by a further distillation at $117-118^{\circ}$ nearly pure citral results.

But to obtain it in a state of absolute purity, free from other constituents of lemon-grass oil, chemical methods must be employed. The citral, preferably separated by fractional distillation, is combined with sodium bisulphite, with which it forms a crystalline compound. This is separated and decomposed by alkalis, when pure citral is liberated. Citral thus prepared has a much finer perfume than lemon-grass oil, hence its employment where the best results are required. Citral can also be obtained by the oxidation of geraniol: 15 parts of geraniol are oxidised by a mixture of 10 parts of potassium bichromate, 12.5 parts of strong sulphuric acid, and 100 parts of water. When reaction is complete, the resulting citral is steam distilled and the impure citral shaken with sodium bisulphite, and the crystals are decomposed by a solution of soda. Citral is a pale yellow liquid with a powerful verbena or lemon-grass odour (also resembling lemon oil in odour—in which it exists to the extent of from 4-5 per cent.). It has a specific gravity about 0.894 and boils at $228-229^{\circ}$. It is used in the manufacture of certain liqueurs, and to an enormous extent for the production of the well-known violet perfume, ionone.

It should be noted that "citral," although usually referred to as a simple chemical compound, is in fact a mixture of two isomeric

bodies, α -citral, or citral simply, and β -citral or neral. This fact is reflected in the presence of two isomers in ionone, which will be referred to later.

Citronellal, $C_{10}H_{18}O$, is the characteristic odorous constituent of citronella oil, in which it occurs associated with geraniol. It is found in various other essential oils, but is obtained commercially from citronella oil only. It is extracted by treating the oil with sodium bisulphite solution, with which it forms a crystalline compound from which the citronellal is separated by decomposition by an alkaline carbonate. It is a colourless liquid with an intense and characteristic odour, somewhat resembling that of melissa (balm). It has a specific gravity about 0.854 and boils at $205-208^{\circ}$ or at $103-105^{\circ}$ at a pressure of 15 mm. Like citral, citronellal is in reality a mixture of two isomeric aldehydes, one of which is termed citronellal simply, and the other rhodinol. It was formerly known as citronellone, but this name is not now used. It is used to a considerable extent in soap perfumery of a cheap character, and has a very lasting odour. About 300 to 400 grams will perfume 100 kilos. of soap, whilst considerably more oil of citronella oil would be required. Further, Ceylon and Java citronella oils are so different from one another, that they cannot be used indifferently; citronellal, on the other hand, always gives uniform results.

Citronellol (*Rhodinol—Rénniol—Roseol*).—Citronellol, $C_{10}H_{20}O$, is found in commerce in a more or less pure condition under the above names, being usually mixed with some geraniol. It appears almost certain now that citronellol exists in two isomeric forms, one of which is now termed citronellol and the other rhodinol. The citronellol of commerce consists in the main of a mixture in varying proportions of these two isomers, the proportions varying according to the source of the citronellol, and the odour, of course, varying to some extent also. It is found in oil of geranium (Bourbon, Spanish, Algerian, etc.), and has a sweet rose odour. It can be extracted in the following manner. The mixed alcohols are transformed by means of an acid anhydride into esters which can be separated from the non-esterified portion of the oil by fractional distillation in a current of steam, and can afterwards be saponified by caustic alkali. To separate the citronellol from the mixture of alcohols so obtained, various methods are employed, of which the following, due to Naschold, is one of the simplest. The mixture of geraniol and citronellol is heated with water in an autoclave to 250° . Geraniol

is decomposed, whilst citronellol remains unchanged. The mixture is then fractionally distilled in a vacuum, and the citronellol comes over at 105° at a pressure of 7 mm., at $117-118^{\circ}$ at 12-13 mm., and at $225-226^{\circ}$ at normal pressure. It is a colourless liquid, with an odour recalling the rose, and is indispensable in artificial rose odours. Its specific gravity is about 0.832. It is however, rather expensive.

Cumic aldehyde, or cuminal, $C_{10}H_{12}O$, is present in cinnamon and other essential oils. Its odour is powerful, and it is not often used in perfumery. Its specific gravity is 0.982, and its boiling point 235° .

Cymene.—This benzenoid hydrocarbon occurs to a small extent in a few essential oils. It is a colourless liquid of agreeable odour, boiling at about 175° . It can also be obtained by the distillation of camphor with phosphoric anhydride, or by heating cumic alcohol with zinc dust, or para-bromotoluene with propyl bromide and sodium. It is occasionally employed in perfumery.

Eugenol, $C_{10}H_{12}O_2$, is a phenol existing to the extent of 80 to 95 per cent. in oil of cloves, of which it is practically the sole odour-bearer. It exists also in oil of cinnamon leaves and in various other essential oils. It can be extracted by shaking the oil with caustic soda solution. Three parts of the oil are well shaken with 10 parts of 10 per cent. caustic solution. The small amount of undissolved sesquiterpene, etc., is separated off, and the aqueous solution extracted with ether to remove dissolved sesquiterpene, and then acidified with dilute sulphuric acid. The eugenol floats on the surface of the liquid, and is washed with dilute alkali to remove traces of sulphuric acid and can then be purified by distillation in a vacuum or in a current of steam. Eugenol is a colourless liquid, turning brown on keeping, and with a powerful clove odour and a burning taste. It dissolves readily in alcohol. Its specific gravity is 1.070, and it boils at $252-253^{\circ}$. It is preferable to oil of cloves for fine perfumery purposes, and serves as a base for carnation perfumes. On heating with alcoholic potash solution, it is converted into isoeugenol, which is the raw material for the manufacture of vanillin.

Fenchone, $C_{10}H_{16}O$, is related to camphor in its chemical constitution, but is a liquid of powerful odour boiling at $192-193^{\circ}$ and having a specific gravity 0.950. It is colourless, and has a strong camphoraceous odour and burning taste. It is rarely used in perfumery.

Furfurol.—This body occurs in a number of essential oils, such as oil of cloves, etc. It is a clear liquid, with a rather unpleasant aromatic odour, recalling that of cinnamon, and also that of almonds. It colours and oxidises on exposure to the air. It is soluble in alcohol and in 12 parts of water. It is artificially prepared from bran, but is of no importance in perfumery.

Geraniol, ($C_{10}H_{18}O$), is the alcohol corresponding with the aldehyde citral. It occurs in numerous essential oils, sometimes in the free state, sometimes in the form of esters. It is the principal constituent of palmarosa (Indian geranium) oil, and is also found in citronella, rose, and ordinary geranium oils.

On a commercial scale, it is extracted either from citronella or palmarosa oil. From the latter, it is extracted by first saponifying the oil to decompose any esters present, diluting with water, and separating the resulting oil. It is then fractionally distilled either at the ordinary pressure, or preferably in a vacuum. The fraction distilling at $228-230^{\circ}$ at the ordinary pressure, or at $120-123^{\circ}$ at 17 mm., or at $110-111^{\circ}$ at 10 mm. pressure, is nearly pure geraniol. Or it may be extracted from palmarosa or citronella oil by the following process, due to Gildemeister. Equal parts of the oil—or preferably the suitable fraction rich in geraniol—and of dry calcium chloride in fine powder, are well triturated together. The mixture is warmed to $30-40^{\circ}$, and is then left for several hours in a desiccator in a cool place. The mass solidifies and is powdered, triturated with anhydrous ether, or with benzene, or with a low boiling petroleum ether, and placed on a filter attached to a pump, and washed several times with ether to remove uncombined oil. The compound of geraniol and calcium chloride is then treated with warm water, which decomposes it, setting free the geraniol, which can be further purified by a steam distillation. Only a part of the geraniol in an oil is obtained in this way, and the oil should contain at least 25 per cent. of geraniol if this process is to be used.

Geraniol is a colourless liquid, of an agreeable rose odour. It is easily soluble in alcohol or ether, and is insoluble in water. It gives a clear solution with 12 to 15 parts of 50 per cent. alcohol at the ordinary temperature. It has a specific gravity of 0.880 to 0.883, and boils at $228-230^{\circ}$. Geraniol is not attacked by alkalis in the cold, but is partially decomposed at 150° . It is used in perfumery in the same way as geranium oil, palmarosa oil, or Otto of Rose. It is a commercial article in the pure state, as

well as in a modified form, such as when it is distilled over hyacinth, rose, geranium, or mignonette flowers. The stereoisomeric form of geraniol, corresponding to the isomeric citral neral, is nerol, found in neroli and petit-grain oils. It boils at $226-227^{\circ}$, and has a specific gravity 0.881. Its odour is soft and sweet, but is distinctly different from that of geraniol.

Nerol, $C_{10}H_{18}O$, is an alcohol isomeric with geraniol, and, as just mentioned, probably its stereoisomer. It was discovered in oils of nerol and petit-grain by Hesse and Zeitschel. Its odour resembles that of geraniol, and is of the rose type, and it is considered to be sweeter and finer than that of geraniol. Commercially, nerol is not employed, as it exists to so small an extent in such an expensive essential oil that it would be far too expensive to extract. It is, however, less costly to extract from petit-grain oil, distilled from the leaves, twigs and young shoots and fruits of the bitter orange. Essences of petit-grain (Paraguay oil, having a specific gravity about 0.886, optical rotation $+4^{\circ}$, and esters, as linalyl acetate 47 per cent.) is saponified at the ordinary temperature for twelve hours with excess of alcoholic caustic potash. The saponified oil is well washed with water, and fractionally distilled with steam under reduced pressure, to remove terpenes and linalol, and a fraction collected composed chiefly of geraniol, terpineol, and nerol (specific gravity 0.890, yield 15-20 per cent.). This fraction is boiled for one to two hours with benzene and phthalic anhydride on the water-bath, and the geraniol and nerol are converted into phthalic acid esters. Excess of phthalic anhydride is removed by freezing and the impure phthalic esters are dissolved in dilute caustic soda solution, and extracted with ether. The purified esters, so extracted, are saponified by caustic potash on the water-bath, and the separated oils consist of nerol mixed with a good deal of geraniol. This is fractionated in a vacuum. Geraniol can be eliminated by the use of anhydride chloride of calcium, which combines with geraniol to form a compound insoluble in petroleum ether. The mixture is triturated with its own weight of dry calcium chloride, and reduced to a fine powder. The mass is then left for several hours, and then exhausted with petroleum ether, which dissolves the nerol, leaving the geraniol combined with the calcium chloride. The solvent is driven off, and the nerol washed with water and rectified in a current of steam under reduced pressure. The yield of nerol from petit-grain oil is about 2 per cent. It is a colourless oil having the same odour

as nerol extracted from neroli oil. In the dilute state its odour is stronger than that of geraniol. Nerol perfectly free from geraniol is obtained by fractionally crystallising its diphenylurethane. When quite pure, its odour is finer than that of the cruder product extracted from neroli or petit-grain oils, and containing geraniol. Its specific gravity is 0.881, and it boils at 226–227° or at 125° at 25 mm. pressure. Nerol exists in small amount in Otto of Rose, in which perfume it plays an important part. If nerol be added to a mixture of geraniol and citronellol, the mixture has an odour which is identical with the mixed alcohols extracted from Otto of Rose by means of phthalic anhydride. According to Tiemann and Schmidt, Otto of Rose contains about 80 per cent. of alcohols, of which about 60 per cent. is geraniol and 20 per cent. citronellol. The 60 per cent. of geraniol includes a small quantity of nerol, which was unknown when Tiemann made the above estimates.

Irone.—Irone is the odorous principle of oil of orris. It is a liquid of the formula $C_{13}H_{26}O$, boiling at 144° at 16 mm. pressure, scarcely soluble at all in water, but soluble in alcohol in all proportions. Irone has an odour recalling that of violets, as does the orris root itself, but unlike that of ioryne. It is not manufactured to any extent to-day. The form in which irone is employed to-day is as either liquid or concrete oil of orris, which contains much irone. It is very useful in perfumery, and is a good fixative, especially in toilet soap perfumes.

• **Jasmone** is a ketone of the formula $C_{11}H_{16}O$, extracted from the higher boiling fractions of oil of jasmine. It is a dark-coloured liquid boiling at 257°, having a powerful jasmine odour. It is soluble in the usual organic solvents. It is the principal odorous constituent of the oil of jasmine, but is rarely, if ever, manufactured on the commercial scale. It is, when available, very useful for mixing with other flower perfumes, but, as stated above, is very rarely used in practice.

Linalol; $C_{10}H_{18}O$, is a tertiary alcohol existing in considerable quantities in oils of linalol and bois de rose, from which it is extracted commercially. Its older names of lavendol, coriandrol, etc., are not now employed. It exists in numerous other essential oils, either free, or combined as esters; for example, bergamot, lavender, neroli, petit-grain, ylang-ylang, spike, and basil.

It is extracted from linaloe oil by fractional distillation. The portion boiling at 190–205° is collected and rectified, and the

distillate between 197° and 200° is practically pure linalol. Its physical properties are as follows:—

Boiling point	$197-200^{\circ}$
Specific gravity	$0.872-0.875$
Optical rotation.....	$+ 20^{\circ}$ to $- 20^{\circ}$

When extracted from linaloe oil it is lævorotatory, but when obtained from coriander oil it is dextrorotatory. It is a colourless oil of an agreeable odour, recalling that of linaloe, and to some extent suggesting roses. It is employed in lily of the valley odours and similar perfumes, but its perfume is very fugitive. Its esters, which are prepared from it, are of considerable value in perfumery.

Menthol, $C_{10}H_{20}O$, is the principal constituent of all varieties of peppermint oil, in which it occurs both in the free state and combined as esters. It is most easily extracted from Japanese peppermint oil, as this variety contains more menthol than any other. The process is very simple. The oil is heated with alcoholic potash to saponify the esters if the maximum amount of menthol is desired, but in practice this saponification is rarely resorted to. The oil (or saponified oil) is exposed to a very low temperature, when a considerable proportion of the menthol is frozen out in the crystalline condition. It is then separated from the "dementholised" oil by a centrifugal apparatus. The liquid portion of the oil contains from 40 to 50 per cent. of menthol, and is sold as "dementholised" peppermint oil. Menthol forms colourless, needle-shaped crystals, melting at $43-44^{\circ}$ and boiling at $215-216^{\circ}$. It has the odour and taste of peppermint, and is employed where a powerful peppermint odour or flavour is required.

Pulegone, $C_{10}H_{16}O$, is extracted from oil of pennyroyal, in which it occurs to the extent of up to 80 per cent. It is a colourless oil, becoming brownish on keeping, with a strong aromatic odour of the peppermint type, boiling at $221-222^{\circ}$. It is rarely used in perfumery.

Safrol.—Safrol, $C_{10}H_{10}O_2$, is the methylene ether of allyldioxybenzene, and is the principal constituent of oil of sassafras, and also occurs to a considerable extent in oil of camphor, from which it is extracted commercially. The essential oil, from which camphor has been removed as far as possible, is fractionally distilled, and the fraction boiling at $225-235^{\circ}$ collected. This fraction is exposed to a very low temperature, when pure safrol freezes out. It is a colourless liquid boiling at 233° and melting,

after being solidified, at $+11^{\circ}$. It is largely used for perfuming soaps, especially of the cheaper kinds, as it covers the bad odour of cheap fats. One kilogram of safrol is sufficient to perfume from 100 to 500 kilograms of fat. A useful mixture for cheap soap perfumery is 2 parts of citronella oil with 1 part of safrol. Safrol is the starting point for the manufacture of heliotropin, which will be dealt with later.

Santalol.—Santalol is the name given to a mixture of two isomeric sesquiterpene alcohols of the formula $C_{15}H_{24}O$ (or possibly $C_{15}H_{26}O$), which together constitute the principal odour-bearer of the essential oil of East Indian sandalwood oil. It is obtained by the fractional distillation of the oil, but as this contains up to 95 per cent. of santalol, there is practically no advantage in manufacturing it, as the normal oil differs but slightly in odour from the isolated santalol. If, however, it is required, it should be prepared by distillation in a vacuum, as it is only very slowly brought over in a current of steam. If steam distillation is used, the steam must be superheated, and the santalol will distil over without decomposition. Santalol is a viscous, colourless liquid with a fine odour of sandalwood, and is used in the same way as the normal oil. It is soluble in 3 volumes of 70 per cent. alcohol and has a specific gravity about 0.978. The two isomeric bodies have similar odours and differ only slightly in physical characters. They are not separated commercially, and the santalol of commerce is always a mixture of the two isomers.

Styrol, or styrolene, C_8H_8 , is phenylethylene, a constituent of the essential oil of storax. It is a colourless liquid of highly aromatic odour, soluble in alcohol and ether. It boils at about 145° and has a specific gravity 0.907. It polymerises on keeping, and forms meta-styrolene, an odourless compound. It can be prepared by heating cinnamic acid with lime to 200° .

Thymol, $C_{10}H_{14}O$, is the phenolic odorous constituent of the oils of thyme and ajowan seed. It is extracted by the usual process for obtaining phenols, which has been described under eugenol. It can also be prepared by various artificial processes, which need not be here described. It forms white crystals melting at $50-51^{\circ}$ and boiling at 252° . It is soluble in alcohol, and has powerful antiseptic properties. Its principal use in perfumery is in the manufacture of antiseptic dentifrices. The waste portion of the oil, after the extraction of the thymol, is sold under the name thymene. It consists mainly of terpenes with a little

thymol, and is used where a cheap thyme odour is required. Its isomer carvacrol is met with in closely related oils, but has very little use in perfumery.

II.—SYNTHETIC AND ARTIFICIAL PRODUCTS

Anisic Aldehyde or Aubepine.—This substance is obtained by oxidising anethole with chromic acid, or more generally with dilute nitric acid, or by methylation of para-oxybenzaldehyde. It is usually manufactured by gently warming anethole for an hour with three times its volume of nitric acid (sp. gr. 1.1) and separating the resulting oil and washing it with an alkaline solution. It is then converted into its bisulphite compound, which is crystalline, and this is decomposed by alkaline carbonate, and the liberated anisic aldehyde distilled in a current of steam. Chromic acid can be used as the oxidising agent, but does not give such satisfactory results as nitric acid.

Anisic aldehyde is a colourless liquid which solidifies at low temperatures. Its specific gravity is 1.1275 and it boils at 246°. Its crystalline compound with sodium bisulphite is sold as "crystalline aubepine," but is not recommended for perfumery purposes. It should be stored in well-stoppered vessels, as it readily oxidises to anisic acid. Anisic aldehyde has a powerful odour of hawthorn, and is used for all perfumes of the "May blossom" type.

Benzoic Acid.—Benzoic acid occurs in the free state in the balsamic resin known as gum benzoin, whence it can be extracted either by solvents or by sublimation. It is produced artificially by several processes, principally by using toluene as the starting point. The benzoic acid obtained by sublimation from the gum has the finest odour and is to be preferred for perfumery purposes. To obtain it in small quantities, dry benzoin in fine powder is placed in a metal crucible about 4-5 cm. high and 20 cm. diameter, to the height of about 2-3 cm., and the top of the crucible is covered with filter-paper pierced with pin-holes. Over this is placed a paper hood, which is tied on with string. The crucible is placed on a sand-bath suitably heated, and the sand heaped round its side. The temperature is kept at about 160-180°, as if it exceeds this the acid will be discoloured and have a burnt odour. In five or six minutes the sublimation is complete and the benzoic acid will be found attached to the

inner surface of the paper hood. The covering of filter-paper is used in order to prevent the crystals from falling back into the crucible. Siam or Palambang benzoin is free from cinnamic acid, and are therefore chosen for sublimation. Sublimed natural benzoic acid is pure, except for traces of other odorous bodies it contains, and which improve its odour; for example, methyl and benzyl benzoates, vanillin, and other substances. It forms fine, brilliant, silky, needle-shaped crystals, colourless, or at most faintly yellow. Its odour recalls that of vanillin, and its taste is aromatic and bitter. It dissolves in boiling water. Its melting point is $121-122^{\circ}$ and it boils at 249° . It should be kept in well-closed vessels, away from the light. Sublimed benzoic acid finds many applications in perfumery, both as a perfume and as a preservative to prevent fats from becoming rancid. In the latter case, however, artificial benzoic acid is preferred, as it is cheaper and has not so rich an odour. Artificial benzoic acid is prepared by the hydrolysis of the chlorination product of toluene. It forms colourless, brilliant crystals, of a less full odour than the natural acid, on account of its being free from impurities. Its melting and boiling points are identical with those of the natural acid. It sublimes at 150° , and is volatile in a current of steam. The vapours of benzoic acid irritate the mucous membranes. The acid is soluble in 15 parts of boiling, and in 300 parts of cold, water; and in 2 parts of alcohol or 3 parts of ether. It is easily soluble in fatty and essential oils.

Methyl benzoate, $C_6H_5CO_2CH_3$, is a constituent of ylang-ylang, tuberose, and other essential oils, and is also prepared artificially, when it is known as oil of Niobe. It is prepared by dissolving benzoic acid in pure methyl alcohol, and passing a current of dry hydrochloric acid gas through the solution. The mixture is kept at 100° for several hours, and water is added when methyl benzoate is thrown out of solution, and sinks to the bottom of the liquid. It can be dried over calcium chloride and purified by rectification. Or it can be prepared by mixing 1 part of methyl alcohol, 3 parts of sulphuric acid, and 4 parts of benzoic acid and heating to 100° . The oil is thrown out of solution on diluting with water.

Niobe oil is a colourless liquid with an agreeable odour, blending well with odours of the ylang-ylang type. It is a favourite constituent of the perfume known as *Peau d'Espagne*, and blends well with sandalwood oil, musk, geranium, and rose. It has a specific gravity 1.1026 and boils at 199° .

Ethyl benzoate, $C_2H_5 \cdot O_2C \cdot C_6H_5$, is a liquid similar to the ester just described. It is prepared by boiling 1 litre of alcohol (96 per cent.) with 400 grams of sulphuric acid, which should be added rapidly, and 1 kilogram of benzoic acid previously melted and broken into small pieces, under a reflux condenser on a water-bath. In about an hour or so the benzoic acid is completely dissolved, and the mixture separates into two layers which are mixed by repeated shaking. When the reaction is over, the two layers are separated, water being added, and the crude ethyl benzoate is removed, washed with water, dilute alkali (2 per cent.) and finally again with water twice. Unaltered benzoic acid, shown by the alkaline liquid giving a precipitate when acidified with hydrochloric acid, indicates that the reaction was incomplete, and the yield will be correspondingly small. The ethyl benzoate is dried over calcium chloride, and fractionally distilled. It boils at 213° and has a specific gravity 1.051.

Amyl benzoate, $(C_5H_{11}) \cdot O_2C \cdot C_6H_5$, is an ester with a slight amber odour, and is used in blending with perfumes of the triple type. It is also an excellent fixative.

isoButyl benzoate.—This ester closely resembles the preceding one, and is used for the same purposes. It is used to the extent of 3 to 4 per cent. with amyl salicylate (*q.v.*).

Benzaldehyde, $C_6H_5 \cdot CHO$, or artificial oil of almonds, exists in bitter almonds in combination with other molecular aggregates in the form of the glucoside amygdalin, and on decomposition of the latter the benzaldehyde is set free, and, mixed with small quantities of other bodies, forms the essential oil of bitter almonds of commerce. It is obtained artificially by heating benzyl chloride with water and lead nitrate, or by heating benzylidene chloride with alkali to 150 – 160° . Benzaldehyde is a colourless, highly refractive liquid, boiling at 179 – 180° and having a specific gravity 1.052. Its odour is that of oil of almonds (not to be confused with that of nitrobenzene—or mirbane). It does not contain prussic acid, which, unless specially removed, is always present in the natural oil. Much of the commercial benzaldehyde contains traces of chlorinated compounds which are difficult to eliminate. If more than traces of chlorine are present, there is a tendency for soap of a pale colour to darken when perfumed with such benzaldehyde. It can, however, be obtained perfectly free from chlorine, and it is this very pure form which is best adapted to replace the natural oil in perfumery. Benzaldehyde is obtainable at low prices to-day and is very seldom adulterated.

Alcohol, if present, is detected by pouring a small quantity into water, when the drops as they mix with water give a cloudiness which is unmistakable. In the absence of alcohol no such turbidity results.

Chlorine, if present in more than minute traces, may be detected as follows: a piece of filter-paper, moistened with a few drops of the sample, folded and placed in a porcelain capsule standing in a porcelain dish, is buried first being covered with a beaker, moistened inside with distilled water. The gases formed by the combustion of the benzaldehyde condense on the inner surface of the beaker, and the adherent water, etc., is washed down with a little more distilled water, and the liquid filtered. To the filtrate is added a drop or two of solution of silver nitrate. If chlorine is present, a milky or curdy precipitate of silver chloride will be formed: if the liquid remains clear, chlorine is either absent or present only in traces. To detect minute traces, careful chemical analysis is necessary. Benzaldehyde is rapidly oxidised to benzoic acid, even more so than natural oil of almonds. The addition of 10 per cent. of alcohol retards this oxidation. Pure benzaldehyde, free from chlorine, may replace natural oil of almonds for most perfumery purposes.

Benzyl acetate, $C_6H_5CH_2O_2CCH_3$, is a colourless liquid of specific gravity 1.057, boiling at 206° . It can be prepared by the interaction of acetic anhydride and benzyl alcohol, or by treating sodium acetate with benzyl chloride. It is purified by rectification, preferably in a vacuum. It has a jasmine odour and is indispensable for the preparation of this odour artificially.

• **Benzyl alcohol**, $C_6H_5CH_2OH$, is an important constituent of oil of jasmine. It can be prepared by emulsifying 100 grams of benzaldehyde with a cold solution of 90 grams of caustic potash in 60 c.c. of water, and allowing the mixture to stand in a closed flask for fifteen to twenty hours. Water is then added to dissolve the crystals formed, the benzyl alcohol formed also being in solution. The liquid is treated with sodium bisulphite to remove unaltered benzaldehyde, and then the benzyl alcohol is extracted with ether, the ether distilled off and the benzyl alcohol purified by fractional distillation. Benzyl alcohol boils at $205-207^\circ$ and has a specific gravity 1.0435. It is a colourless liquid with a slightly aromatic odour, easily soluble in alcohol. The addition of 1 to 2 per cent. to benzyl acetate renders the latter much more permanent, and brings the perfume out well.

Borneol and isoborneol, $C_{10}H_{17}OH$, are isomeric alcohols, of

similar characters. Ordinary borneol, or Borneo camphor, is the dextrorotatory form of borneol. It is also found as laevo-borneol in the plant *Blumea balsamifera*, when it is known as Ngai camphor. It exists, both free and as bornyl esters, in numerous essential oils. It is found to a considerable extent in the vessels of the wood, and underneath the bark of *Dryobalanops camphora*, a tree indigenous to Borneo and Sumatra, and is obtained to a small extent from this source. Very little natural borneol, however, reaches Europe, as it is consumed in the places of production, so that it is obtained artificially from ordinary camphor. Fifty grams of camphor in 500 c.c. of 96 per cent. alcohol are mixed with 60 grams of sodium in small pieces, in a flask attached to a reflux condenser. The sodium is added gradually in small quantities at a time. The operation takes about an hour, and the heat generated by the reaction should not be moderated. Towards the end of the reaction, 50 c.c. of water may be added, with energetic shaking, so as to facilitate the last traces of the sodium entering into reaction. When the sodium has entirely disappeared, the contents of the flask are poured into 3 to 4 litres of water, and the whole allowed to stand. The deposited borneol is then collected on fine muslin, and washed free from alkali with water. The mass, dried by exposure to air, is then recrystallised from low boiling petroleum ether. The final product is usually a mixture of about 80 per cent. of borneol and 20 per cent. of isoborneol. Most processes for the production of borneol give a mixture of the two isomers. Pure Borneol is prepared by the saponification of bornyl acetate. Artificial borneol forms large, clear, transparent crystals, in tablet or scale forms, melting at 208° , and possessing an odour resembling, but more agreeable than, camphor. It is easily soluble in alcohol. *iso*Borneol can be obtained by treating camphor with glacial acetic acid and sulphuric acid, and saponifying the isobornyl acetate so obtained. Its odour resembles that of borneol. *iso*Borneol melts at 217° . Both isomers are of use in perfumery.

Bornyl acetate, $C_{10}H_{17}O_2 \cdot C_2H_3$, is the principal odorous constituent of the sweet-smelling varieties of pine-needle oils. It is prepared artificially from borneol by dissolving it in acetic anhydride in the presence of sodium acetate and boiling the mixture. It is then distilled under reduced pressure, and when pure has a specific gravity 0.991 and boils at 98° at 10 mm. pressure. It forms colourless crystals which melt at 29° . It is

employed where a very fine and very powerful pine-needle odour is required.

Cassie Oil (artificial).—The first artificial cassie oil, which is an imitation of the perfume of the flowers of *Acacia Farnesiana*, was a patented article. Benzyl alcohol, methyl salicylate, linalol, geraniol, terpineol, cumic and decylic aldehydes, and a ketone having a violet odour were detected as constituents of the natural oil. The composition of the patented oil was given by Schimmel and Co., the patentees, as follows:—

Methyl salicylate	550 gr.
Benzyl alcohol	200 "
Linalol	80 "
Geraniol	12 "
Terpineol	28 "
Ionone	20 "
Irone	60 "
Cuminic aldehyde	30 "

This was either used alone, or with the addition of 20 grams of decylic aldehyde. Haarmann and Reimer have carried out a research on this oil and found present other substances not included in the above-described patent. Amongst these is farnesol, an alcohol of the so-called aliphatic sesquiterpene series. Anisic aldehyde is also present. The above information should enable perfumers to reproduce the cassie odour fairly accurately.

Lemon Oil (artificial).—This substance, once suggested as a substitute for natural oil of lemon, is so useless in perfumery and is so poor an attempt to match the natural oil that it need not be described here.

Coumarin, $C_9H_6O_2$, is the odorous constituent of the Tonquin bean, the seeds of at least two species of *Dipteryx*, and of the leaves of the "deer's tongue," *Liatris odoratissima*. It also occurs in numerous other aromatic plants. It is only extracted from the Tonquin bean on the laboratory scale. For commercial purposes, it is entirely produced artificially. There are numerous methods of producing it, of which that originally due to Perkin, and elaborated by Tiemann and Herzfeld, may be briefly described.

Three parts of salicylic aldehyde, 5 parts of acetic anhydride, and 4 parts of dry sodium acetate are heated on an oil-bath to boiling point. The mixture is allowed to cool, the crystalline magma is thoroughly extracted with hot water, and the oily extract is treated with ether, and washed with dilute alkali to remove acetyl-coumaric acid. The latter is separated by the

addition of hydrochloric acid, and the acetyl-coumaric acid so obtained is heated to 150° , when it decomposes into acetic acid and coumarin. This, with the previously formed coumarin, is dissolved in ether, again washed with alkali, and the ethereal solution allowed to evaporate, and crystals of coumarin are deposited. Salicylic aldehyde can be prepared from phenol, so that phenol may be regarded as the starting point for the manufacture of coumarin. Coumarin forms colourless, rhomboid, or scale-like crystals, of a beautiful odour of new-mown hay. Its taste is bitter and burning. It dissolves in 500 parts of cold water, in 50 parts of boiling water, and freely in alcohol, ether, essential and fatty oils and petroleum jelly. It melts at $67-68^{\circ}$, and sublimes without decomposition at water-bath temperature. It boils at about 290° . It is sometimes adulterated with acetanilide. To detect this, 0.1 gram is boiled with 1 c.c. of hydrochloric acid for a minute and the clear solution is treated with 2 c.c. of a 5 per cent. solution of phenol and a little clear solution of chloride of lime. The solution, if acetanilide be absent, should not give a red coloration. A red colour, turning to an indigo blue when excess of ammonia is added, indicates the presence of acetanilide. One gram of coumarin may be used in the place of about 60 grams of Tonquin beans, in perfumery.

Geranyl Acetate, $C_{10}H_{17}CO_2CH_3$, is prepared from geraniol in the same manner as linalyl acetate from linalol (*q.v.*). It is a colourless liquid of a very pleasant odour, recalling that of rose, lavender, and bergamot. It boils at $242-245^{\circ}$, or at 130° at 14.5 mm. pressure, and has a specific gravity 0.917. It is very useful in perfumery in many directions.

Heliotropin or Piperonal.—This body is the odorous principle of the heliotrope flower. It was first artificially prepared from piperic acid, derived from piperine, the alkaloid of pepper. Chemically it is the methylene ether of protocatechuic aldehyde, $C_8H_6O_3$. It is to-day entirely prepared from safrole, the odorous principle of sassafras oil, but which, on a commercial scale, is obtained from camphor oil. In the first place, safrol is converted into isosafrole by heating with a solution of caustic alkali. *iso*-Safrole (500 parts) is then oxidised by means of bichromate of potash (2500) dissolved in water (8000) and mixed with sulphuric acid (3800). The process is carried out as in the manufacture of anisic aldehyde. The crude product is distilled in steam, and extracted with ether, purified by means of its sodium bisulphite compound in the usual manner, by drying the crystals, decomposing

them with dilute caustic soda, and finally steam distilling the product.

Heliotropin forms colourless prismatic crystals, of a powerful heliotrope odour and a taste recalling that of mint. It is nearly insoluble in cold water, and on warming the water the heliotropin melts and floats on the surface as an oily liquid. It is freely soluble in alcohol, ether, and essential oils. It melts at 37° , and boils at 263° . It is slowly decomposed under the influence of light and warmth, taking on a disagreeable odour and becoming useless for perfumery purposes. It should therefore be kept in a cool place away from the light. In the summer months, it is best to keep it dissolved in alcohol, and even then to keep it in a cool, dark place. It is of the greatest importance in perfumery, and its use is always increasing. It is amongst the most largely employed of the artificial perfumes. It owes its value to its very fine perfume, which is as soft as any natural perfume, and of great lasting power. It decomposes more rapidly when it is not quite pure, so that perfumers should use only the purest possible brands. Heliotropin is seldom adulterated to-day, although when competition was very keen and prices very low admixture with acetanilide was not common. Two varieties of heliotropin are found in commerce, the crystalline in large white crystals, and the amorphous variety. It should melt sharply at 37° and give a clear, practically colourless solution in alcohol, otherwise it should be regarded with suspicion. To detect adulteration, 10 grams should be heated with constant agitation on a water-bath, with 50 c.c. of a 30 per cent. solution of sodium bisulphite, for about ten minutes. On cooling, the liquid is extracted several times with ether, and the ether separated. On evaporation of the ether, no appreciable residue should be left; if there should be any, it represents the amount of added matter, such as acetanilide in the 10 grams examined. If such a residue be crystalline and is found to melt at $112-113^{\circ}$ after recrystallisation from hot water, it may be regarded as certain that it is acetanilide. Amorphous heliotropin is usually understood to be a mixture; but it should be free from odourless adulterants such as acetanilide. It is usually a mixture of 90 per cent. of heliotropin with 10 per cent. of vanillin. Its odour is rather truer to the flower than pure heliotropin.

Hyacinth (artificial).—There are several artificial products on the market which possess, in a more or less perfect manner, the sweet perfume of the hyacinth. Most of them are mixtures, the

exact compositions of which are kept as trade secrets. There are, however, several products which are the recognised basic substances for such mixtures, and which, judiciously used, will serve as bases for the preparation of artificial hyacinth perfumes. These basic substances are the following: α -chlorostyrolene, α -bromostyrolene, and, more especially, phenylacetic aldehyde. Although none of these three bodies appears to exist in natural oil of hyacinth, they all possess an extremely powerful odour of this type of flower, and phenylacetic aldehyde may be regarded as absolutely essential in the preparation of perfumes of the hyacinth and narcissus type. α -Bromostyrolene is also much employed for the same purpose. As subsidiary constituents of such perfumes, benzyl alcohol, benzyl acetate, and cinnamic alcohol are important, and when judiciously mixed with a little terpineol, excellent artificial hyacinth perfumes will be obtained. Hydroxycitronellol is a recently introduced perfume with an odour of the lily type, and is worth experimenting with in this connection.

Phenylacetic aldehyde boils at $205-207^{\circ}$ and has a specific gravity 1.085. It was obtained by Cannizzaro by distilling phenylacetate and formate of lime, but on the commercial scale the process of Erlenmeyer is more generally used.

This consists in the use of β -propenylchlorolactic acid, which is treated with soda. This is steam distilled in the presence of a little sulphuric acid, and phenylacetic aldehyde comes over. A better yield is obtained if the bromo-acid be used instead of the chloro-acid. The aldehyde has the formula C_8H_8O .

isoEugenol (artificial carnation).—*iso*Eugenol, which possesses a powerful carnation odour, is the principal ingredient of artificial essences of this type. Its odour, although similar to, differs from that of eugenol, which is purely that of the clove bud, whilst *isoeugenol* furnishes the distinctive note of the clove or carnation flower. The two bodies are almost invariably used together for artificial clove or carnation mixtures.

*iso*Eugenol is found to a small extent naturally, in ylang-ylang and nutmeg oils, for example. It is prepared from eugenol as follows, the process being that due to Tiemann. Twelve parts of caustic potash are warmed with 18 parts of amyl alcohol, and insoluble carbonate of potash is filtered off. To the solution 5 parts of eugenol are added, and the mixture is heated for sixteen to eighteen hours on a paraffin bath to 140° . The alcohol is distilled off in steam, the residual liquid acidified with sulphuric acid (the mixture being kept cold by

packing in ice during this operation, otherwise resinification will take place), and the free *isoeugenol* distilled by steam; rectified by a further distillation in a vacuum, and allowed to crystallise on cooling. *isoeugenol* is a pale yellow liquid of specific gravity 1.088, and boils at 262° . On exposure to the cold, it solidifies, the needle-shaped crystals melting at 340° . It is only slightly soluble in water; but freely soluble in alcohol and ether. The best perfumes of the curdation type contain mixtures of *isoeugenol* and *eugenol* in about equal proportions, with some *methyleugenol* and *methylisoeugenol*. These two methyl ethers will be found most useful adjuncts to give clove and carnation odours distinctive notes.

isoSafrole.—This body is employed in perfuming cheap soaps, and is the body into which safrol is converted in the process of manufacturing heliotropin. Its odour resembles that of aniseed. It is not found in nature, but is prepared from safrole entirely. The process evolved by Ciamician and Silber is as follows: 100 grams of safrol are heated on a water-bath for twenty-four hours with 250 grams of caustic potash (purified by means of alcohol) dissolved in 1000 c.c. of 94 per cent. alcohol. Water is then added, the alcohol driven off by evaporation, the safrole extracted with ether, the ether evaporated, and the *isosafrole* dried over calcium chloride. *isoSafrole* is a colourless liquid of specific gravity 1.1255, and boils at 254° . It is soluble in alcohol and ether.

Artificial Jasmine Oil. Hesse and Muller recently carried out exhaustive researches on the composition of natural jasmine oil, and as a result they published the following as the average composition of the oil: benzyl acetate 65 per cent., linalyl acetate 7.5 per cent., benzyl alcohol 6 per cent., linalol 15.5 per cent., indole 2.5 per cent., jasmone 3 per cent., and methyl anthranilate 0.5 per cent. The use of indole in certain flower perfumes improves their odour considerably, although in the pure state it has a very objectionable odour itself. Geraniol and para-cresol have more recently been isolated from jasmine oil. From the bodies above mentioned a fairly faithful reproduction of jasmine oil can be obtained, but as jasmone has not been prepared artificially, its particular odour can only be obtained by the use of some natural jasmine essence. Artificial jasmine oil is of a brownish colour, owing to the presence of indole, which turns dark brown under the influence of light. Five grams of such an oil are of the perfume value of about 1 kilogram of jasmine pomade. Verley

has prepared a substance which he terms 'jasmal, which has a useful jasmine odour. Fifty parts of phenylglycol are heated on the water-bath with 100 parts of formaldehyde, 125 parts of sulphuric acid, and 3 or 4 parts of water. The oil which floats on the surface of the liquid is separated and distilled in a vacuum. It comes over at 101° at a pressure of 12 mm., or at 218° at the ordinary pressure. A similar body results if formaldehyde be substituted by acetic aldehyde, the body then boiling at 103° at 12 mm., or at 222° at the ordinary pressure. The following has been recommended as a useful artificial jasmine oil: benzyl alcohol 200 parts, benzyl acetate 550 parts, linalyl acetate 150 parts, linalol 200 parts. Heine & Co. took out a patent, some years ago, which yields a jasmine oil said to equal in perfume the best jasmine enfleurage pomade. Its composition is as follows:—

Benzyl acetate	27.5 parts
Jasmone	1.5 " "
Linalyl acetate	11.0 " "
Linalol	2.5 " "
Methyl anthranilate	0.1 " "
Benzyl alcohol	11.65 " "
Indole	1.25 " "

Ionone, $C_{13}H_{20}O$, an artificially prepared body, is isomeric with ionol, the odorous constituent of orris root, and is amongst the most important of artificial perfumes. It is prepared by the condensation of citral with acetone in the presence of an alkali. The condensation product is pseudo-ionone, an isomer, which is transformed into ionone by the action of dilute acids. Ionone consists of two isomeric bodies known as α -ionone and β -ionone. If strong acids are used for the transformation, β -ionone preponderates, whilst α -ionone is the principal body resulting when dilute acids are used.

Ionone of commerce contains both bodies, α -ionone preponderating. Tiemann recommends the following process for the manufacture of ionone. Sixty-five c.c. of acetone, 50 c.c. of citral, and 1000 c.c. of a cold saturated solution of barium hydrate are placed in a flask holding 1500 c.c. The flask is shaken from time to time for several days. The reaction product is extracted with ether, the ether driven off by evaporation, and the residue fractionally distilled in a vacuum. The fraction boiling at 138 – 155° at 12 mm. is collected, unaltered citral is driven off in a current of steam, together with acetone and any easily volatile condensation products, and the remainder is again fractionally distilled. The fraction boiling at 143 – 150° at 12 mm. consists of pseudo-ionone.

Or, a mixture of 50 parts of citral, 30 parts of acetone, 50 parts of glacial acetic acid, 100 parts of acetic anhydride and 150 parts of acetate of sodium is heated to boiling for several hours, or to 110° as a maximum, in an autoclave. The product of the reaction is poured into water and the acid neutralised. The crude oil—pseudo-ionone—thus obtained is purified as above described. Pseudo-ionone is a colourless oil of a nondescript odour, of specific gravity about 0.902. It is transformed into ionone, principally α -ionone, by means of dilute acids. Twenty-two c.c. of pseudo-ionone, 100 c.c. of water, 1.5 c.c. of concentrated sulphuric acid and 79 c.c. of glycerine (or similar proportions) are heated to boiling for one hundred and eight hours and extracted by ether on cooling. The ether is driven off and the residue fractionally distilled, the fraction boiling between 125° and 135° at 12 mm. being crude ionone. This is rectified in a vacuum and the purified ionone collected at 126 – 132° at 12 mm. The patents for the preparation of ionone, most of which have expired, are too numerous to discuss. As above indicated, ionone consists of a mixture of two isomeric ketones. Modifications in the details of manufacture enable one to vary the proportions of the two isomers as desired, and further, the mixture can be separated into its two pure components, α -ionone and β -ionone. To separate the two bodies, the following process may be employed. The mixture is boiled with a solution of sodium bisulphite to which has been added half its molecular quantity of acetic acid, or an excess of sulphate of ammonia, to fix any alkali liberated by the reaction. The solution is freed from neutral impurities by extraction with ether, and submitted to a current of steam which carries over the β -ionone, which can be further purified by conversion into its semicarbazone, and then liberating it from this compound. To extract the α -ionone from the sulphite solution, the sulphite compound may be decomposed by sodium carbonate and the α -ionone distilled with steam: or hot caustic alkaline solution may be added, and after a few moments of contact the solution is cooled, and extracted with ether; or after the action of the caustic soda, the liquid is neutralised and the α -ionone distilled in steam. In any case, it is necessary to purify it by conversion into its crystalline oxime and liberating the ionone from this compound.

When the mixture contains but little α -ionone, the sulphite solution may be concentrated until the hydrosulphonic compound of α -ionone crystallises out, and is redissolved and decomposed by caustic alkali, the alkali neutralised, and the liquid steam

distilled. Ordinary ionone is a colourless liquid of specific gravity 0.935 to 0.940. It is soluble in alcohol or ether, and possesses an intense odour which recalls that of violets and of vine leaves. Its perfume can only be appreciated in very dilute solutions. It used to be sold as a 10 per cent. solution, but to-day it is always sold in the pure state. α -Ionone is a colourless liquid boiling at 127–128° at 12 mm. pressure and having a specific gravity 0.934. β -Ionone boils at 134–135° at 12 mm., and has a specific gravity 0.949. They differ in their “shade” of violet perfume. α -Ionone has a soft, sweet, and penetrating odour, more of the orris type than that of true violets, whilst β -ionone has a sharper odour and more closely resembles the true violet flower. In the ordinary way, the perfumer employs ordinary ionone, in which the two isomers are well balanced as the result of years of manufacturing experience. Various shades of the violet perfume can, however, be made, according to personal taste, by a judicious use of the two isomers in varying proportions. It is also possible to obtain numerous other violet odours sold under fancy names, and composed of either the ionones or similar homologous bodies, often protected by patents, such as iraldeine, ionarol, irisone, violettone, etc.

Iraldeine, for example, resembles ionone closely, whilst ionarol has a violet odour together with a secondary herbaceous odour. In various recipes, ionone is partly replaced by one or other of these proprietary perfumes. In the manufacture of violet extracts, one usually employs 8 to 10 grams of ionone or similar substance per litre of alcohol.

It sometimes happens that the odour of ionone seems to disappear completely, especially when the weather is damp, and then return again. This phenomenon is observed in the odour of violet flowers. But it is clear that it is a purely subjective phenomenon of an accidental nature. It happens with people using ionone for a certain time, and is due to a temporary atrophy of the olfactory nerve-endings. If persons so affected walk in the open air for a short time the inconvenience disappears and they can again appreciate the violet odour. There are many products in commerce having a violet odour. They are, however, all composed of ionone or its homologues, with or without inert material as a diluent. So-called crystal ionone is a mixture of ionone with artificial musk. “Violet concrete” is usually concrete oil of orris, with artificial musk and a little green colouring matter. Violettone is probably absolutely pure

ionone, α -violettone being α -ionone and β -violettone, β -ionone. The last-named bodies are prepared by Naeff & Co., of Geneva, under patents. The chemists of this firm have done a great deal of research work on the violet perfume.

Linalyl Acetate, $C_{10}H_{17} \cdot CO_2 \cdot CH_3$, is the principal constituent of the oils of bergamot and lavender, and is found in many other essential oils. It is prepared artificially by the esterification of linalol, and is sometimes sold under the name "artificial bergamot oil" or bergamiol. It is prepared by allowing 10 parts of linalol, 250 parts of acetic acid and 8 parts of sulphuric acid to stand at a moderate temperature for twenty-four hours. The mixture is then poured into water and the separated oil distilled with steam under reduced pressure. The resulting product is not absolutely pure, but contains a little geranyl acetate and terpin hydrate. A fairly pure body can be obtained by heating linalol and acetic anhydride at 100° and distilling the product with steam. The resulting oil is washed with dilute caustic soda solution and rectified in a vacuum. The yield, however, is not high. Linalyl acetate is a colourless liquid, of an agreeable, soft odour, resembling that of bergamot, and when mixed with geranyl acetate recalling that of lavender. It has a specific gravity 0.913 and boils at about 220° with decomposition.

Artificial Mandarin Oil.—This body has no use in perfumery, and need only be mentioned as having been the subject of an early patent. The mixture said to reproduce the mandarin oil odour is composed as follows: limonene 800, dipentene 250, decylic aldehyde 1, nonylic aldehyde 2, linalol 4, terpineol 3, methyl anthranilate 40 parts. No perfumer who could get the natural oil would, however, use this substitute.

Artificial Musk.—The various bodies known as artificial musk are not identical with the odorous constituents of natural musk nor have they any relationship with them. The earliest commercial imitation of natural musk was that patented by Baur. Toluene or xylene, transformed into the corresponding butyl derivative, eventually yields the corresponding trinitro-butyl-toluene or trinitro-butyl-xylene.

Trinitro-butyl-toluene is obtained by heating on an oil-bath to 150 – 160° 5 parts of toluene with 1 part of butyl bromide or chloride, and 0.2 part of aluminium chloride, under a reflux condenser. When no more halogen acid is evolved, the reaction is over. The mixture is treated with water and steam distilled. The oily layer, containing some unaltered toluene, is separated

off, dried over calcium chloride, and fractionally distilled. The fractions distilling at $170-200^{\circ}$ consist in the main of tertiary butyl toluene. This body is now poured gradually into nine times its weight of a mixture of 1 part of fuming nitric acid (sp. gr. 1.52) and 2 parts of fuming sulphuric acid (15 per cent. anhydride). The mixture is kept cold, and then heated on a water-bath to 100° for eight to nine hours, the reaction product cooled, poured into six times its weight of water, and the caked mass washed with water until it is neutral and then melted in boiling water. It is allowed to stand for fifteen minutes, the water is decanted, and after well washing with cold water, it is crystallised from 90 per cent. alcohol. This form of artificial musk is not much used in perfumery.

Trinitro-butyl-xylene is the usual artificial musk, or xylene musk, of commerce. It is obtained by starting from xylene instead of from toluene, the final product having a powerful musk odour. Xylene, isobutyl chloride and aluminium chloride are heated in an oil-bath to a temperature of $150-160^{\circ}$. The reaction products are poured into water and steam distilled. The reaction is over when hydrochloric acid ceases to be given off. The resulting oil is fractionated, and the tertiary-butyl-xylene is poured gradually into twelve times its weight of a mixture of nitric and sulphuric acids as above indicated, the vessel being kept cold during the admixture. The product is then heated at $70-75^{\circ}$ for two hours under a reflux condenser, and the liquid poured into a large volume of cold water. The separated mass is well washed with cold water until it is neutral and finally crystallised from alcohol. The form of xylene used for the preparation of artificial musk is that known as meta-xylene. This is the usual artificial musk of commerce, and forms pale yellowish crystals melting at $110-113^{\circ}$.

Ketone musk is the result of the nitration of the ketone produced by introducing an acetyl group into the butyl-toluene molecule. Similar ketonic musks result from the butyric or valeric ketones.

By dissolving 1 part of butyl-toluene in 10 parts of carbon bisulphide and adding 6 parts of aluminium chloride and 6 parts of acetyl-chloride, the methyl ketone of butyl-toluene is obtained. It is an oil of agreeable odour, boiling at $255-258^{\circ}$, and by nitration is converted into a dinitro-derivative melting at 131° , and having a powerful musk odour. From butyl-xylene, a similar ketonic derivative is obtained, which boils at 265° , and melts at 48° .

By nitration with ten times its weight of nitric acid (sp. gr. 1.525) at a low temperature, a dinitro-derivative melting at 136° , with a powerful musk odour, is obtained. Similar bodies are obtained by using butyl and valeryl chlorides, both having strong musk odours.

Another form of artificial musk met with in commerce is that known as "Musk Ambrette," which is usually regarded as the finest of all the artificial musks. It is a nitro-compound of the methyl ether of butyl-meta-cresol, and melts at 85° .

There are various others, known as aldehyde musk, cyanide musk, and dinitro-butyl-xylene bromide, but they find practically no employment in perfumery to-day.

Artificial musk is often adulterated with acetanilide. This can be detected by extracting the sample with twenty times its weight of boiling petroleum ether, when the residue is almost free from the musk compound. This is dried and recrystallised seven or eight times from hot water, when the acetanilide can be identified by any of the usual reactions. Practically all the patents for the preparation of artificial musks have now expired and they are commercial articles freely manufactured at reasonable prices.

Two old patents for the preparation of musk-like substances from turpentine and similar substances have often been referred to in works on perfumery, but as they are obsolete and have been entirely superseded by the above described processes, they need not be described.

Neroline (*Yara-Yara*, or *Bromelia*).—There are two products known in commerce as neroline, one being the methyl, and the other the ethyl ether of β -naphthol. The methyl ether is, however, usually known as yara-yara, whilst the ethyl ether is known as bromelia. The substance known under the name fragarol, with its slight fruity odour, is the corresponding butyl ether. The methyl ether, or yara-yara, is prepared by heating 5 parts of β -naphthol with 5 parts of methyl alcohol and 2 parts of strong sulphuric acid on the water-bath for four to eight hours under slight pressure to a temperature of 125° . Unaltered alcohol is driven off by distillation, and the residue is washed with water, steam distilled, and crystallised from ether. Or it may be prepared by heating β -naphthol-sodium with methyl iodide in methyl alcohol, driving off the alcohol and excess of methyl iodide, steam distilling, and crystallising from ether. This ether melts at 72° and boils at 274° ; it forms colourless tablets and has a powerful

odour, very pleasant when diluted and vaguely recalling that of neroli. It is only slightly soluble in alcohol, but is very soluble in ether. It is a useful substance for perfumery work. The ethyl ether, or bromelia, is prepared in a similar manner to that used for the methyl ether: 1 part of β -naphthol, 3 parts of ethyl alcohol and 1 part of hydrochloric acid are heated on a water-bath in a closed vessel at 150° for seven hours. Or it can be produced by heating β -naphthol-sodium with ethyl iodide or bromide in ethyl alcohol. The ethyl ether melts at 37° and boils at 282° . Its odour is as strong as that of the methyl ether, but finer, and with a suggestion of acacia and pineapple. It is used freely in perfumery.

Fragarol is the corresponding butyl ether, and is employed in soap perfumery. It is a good fixative. Yara-yara is one of the intense artificial odours, and is used instead of neroli oil in cheap preparations.

Artificial Oil of Neroli.—Several years ago one of the most important odorous constituents of neroli oil was isolated, and since then it has been used, in combination with other constituents found in the oil, for the manufacture of an artificial oil of neroli. This body is methyl anthranilate, which forms crystals melting at 24° , and in the pure state has a disagreeable odour, and requires considerable dilution before its neroli odour comes out. Anthranilic, or ortho-amidobenzoic acid, was originally obtained from indigo, but is now prepared by reducing ortho-nitrobenzoic acid by tin and hydrochloric acid, or by oxidising aceto-toluidine with potassium permanganate and heating the resulting products with hydrochloric acid. The free acid is then converted into its methyl ester by condensation with methyl alcohol in the presence of acids. Under the fancy names irolene, narceol, and amantol, combinations of this ester with other bodies have been put on the market. By mixing methyl anthranilate with linalyl acetate, a perfume base is obtained of the bergamot type; or if mixed with benzyl alcohol and benzyl acetate, a jasmine base results; but only very small quantities of the ester must be used. There are numerous artificial oils of neroli on the market, the exact compositions of which are, of course, trade secrets. But by judicious blending of the following bodies an oil closely resembling oil of neroli will be obtained, especially if it be based on a little natural oil with or without the addition of petit-grain oil: geraniol, geranyl acetate, linalol, linalyl acetate, methyl anthranilate, indole, a trace of decyl aldehyde, a trace of phenyl ethyl alcohol and

a little limonene. Néroline (bromelia) may be added in small quantities, and nerol, if available, assists the odour—but is rarely obtainable and is very expensive. An old patent of Heine & Co. gives the following as the composition of artificial neroli oil: limonene, linalol, linalyl acetate, geraniol, methyl anthranilate, phenyl ethyl alcohol and 0.3 per cent. of indole.

Nitrobenzene, $C_6H_5 \cdot NO_2$, is also known as oil of mirbane. It was once called artificial oil of almonds, but this is a misnomer and is not now employed. It is prepared by nitrating pure benzene (carefully rectified, boiling at $80-81^\circ$) in a vessel furnished with a stirring apparatus. About 80 parts of benzene are placed in the vessel, and a mixture of 105 parts of nitric acid of specific gravity 1.4 and 160 parts of concentrated sulphuric acid is slowly run in, the operation taking about twelve hours, the benzene being in slight excess. The stirring should take place during the whole of the operation and for twelve hours afterwards. The crude nitrobenzene which separates from the acid is then distilled in a still in which water is present and the distilled water from which the nitrobenzene separates is repeatedly returned to the still. If distilled without water, nitrobenzene has a tendency to decompose with evolution of gas, which may be dangerous. Pure nitrobenzene distils at $210-211^\circ$. It is a yellowish oil, of specific gravity 1.208, possessing a powerful, disagreeable, penetrating odour, suggestive, in a coarse way, of almond oil. Its taste is burning. It solidifies at $+3^\circ$. It is very soluble in alcohol, ether, and in fatty and essential oils, but is practically insoluble in water. It is only employed in the cheapest soaps, or for covering the disagreeable odour of boot polishes, etc.

Artificial Otto of Rose.—Numerous artificial rose perfumes are on the market, the exact compositions of which are, naturally, trade secrets. They agree, however, in so far as the best of them are concerned, in three points. First, to have any real value in high-grade perfumery, they must be based on a certain amount—say 25 per cent.—of natural Otto of Rose. Secondly, they must contain that constituent of the rose flower which is so soluble in water, and which therefore is removed from the Otto in the distillation waters, namely, phenyl ethyl alcohol; and, thirdly, they must contain a mixture of (a) alcohols—geraniol and citronellol; (b) esters, including several of the homologous esters of geraniol such as geranyl acetate and geranyl butyrate; (c) a very small quantity of the higher aldehydes, such as nonylic aldehyde. In addition to these bodies, the natural Otto contains minute

quantities of other compounds, such as traces of eugenol, etc. The perfumer who wishes to make his own artificial rose oil would do well to experiment carefully on the use of minute quantities of phenylacetic acid, which gives the so-called "honey odour" to Otto of Rose.

Salicylic Aldehyde (*Reine des Prés, Queen of the Meadows*), $C_7H_6O_2$, is an aldehyde present in the essential oil of the leaves and twigs of *Spiræa Ulmaria* and other species of *Spiræa*, from which it can be extracted. But in practice it is obtained artificially in the following manner. Ten parts of phenol are mixed with a solution of 20 parts of caustic soda in 35 parts of water. This mixture is heated at $50-60^\circ$ on the water-bath in a flask attached to a reflux condenser, and 15 parts of chloroform are added gradually in small portions. The reaction is energetic and the mixture becomes yellow, then violet, and finally cherry-red in colour. When all the chloroform has been added, the temperature of the mixture having risen considerably, the whole is heated for another half-hour, and then the excess of chloroform distilled off. The solution is then acidified with dilute sulphuric acid and the product distilled in a current of steam until no more oily globules are carried over. The distillate is extracted with ether, and the ether solution containing salicylic aldehyde and unaltered phenol is heated to drive off most of the ether. The residue is treated with a solution of sodium bisulphite, and the crystals which separate—consisting of the bisulphite compound of the aldehyde—are filtered off, when no more crystals are formed by further shaking with bisulphite solution. The crystals are pressed, and then washed with alcohol, to remove any trace of phenol (the bulk of which has been removed in the ether), by filtration. The crystals are then decomposed with warm dilute sulphuric acid, and the aldehyde dissolved out by ether, the ether evaporated, and the oil dried over calcium chloride and distilled. Salicylic aldehyde was originally obtained artificially by the oxidation of salicine, but this method is only of historical interest and is never employed commercially. It is a colourless liquid of specific gravity 1.170, boiling at 196° . Its odour is that of meadowsweet, with a suggestion of almonds. It solidifies at 20° . It is slightly soluble in water, but freely soluble in alcohol and ether. Salicylic aldehyde is an intermediate body in the preparation of coumarin.

Methyl Salicylate, $C_6H_4 \cdot OH \cdot CO_2 \cdot CH_3$, is known as artificial oil of wintergreen. It is the principal constituent of the essential oils of wintergreen and of sweet birch (*Betula lenta*), both of which

contain up to 99 per cent. of this ester. It follows that the artificial body is almost identical with the natural oils. It is prepared by heating a mixture of 2 parts of salicylic acid, 2 parts of methyl alcohol, and 1 part of sulphuric acid under a reflux condenser for twenty-four hours, and distilling the product in a current of steam. The oily liquid so obtained is carefully washed with water, dried with anhydrous sodium sulphate, and filtered. It is a colourless liquid, identical, or practically so, in odour with wintergreen oil, of specific gravity 1.1818, and boiling at 224° . It is used in place of the natural oil.

Ethyl Salicylate, $C_6H_4 \cdot OH \cdot CO_2 \cdot C_2H_5$, closely resembles the methyl ester in character. It is prepared by heating 1.5 parts of salicylic acid, 1 part of sulphuric acid, and 2 parts of ethyl alcohol in the manner described above. By distillation alcohol passes over first, then a little unaltered salicylic acid with alcohol, and finally ethyl salicylate. The crude oil is washed with very dilute ammonia, dried over calcium chloride, and rectified. It is a colourless liquid with an odour closely resembling oil of wintergreen, having a specific gravity 1.1372 and boiling at 234° . It is used to some extent in perfumery.

Amyl Salicylate, $C_6H_4 \cdot OH \cdot CO_2 \cdot C_5H_{11}$, is prepared in the same manner as the methyl and ethyl esters, using amyl alcohol. But it is necessary to use great care in getting rid of impurities, as these are less volatile and more disagreeable in odour than those resulting in the preparation of the methyl and ethyl esters. It is a colourless oil of specific gravity 1.052, and boils at 276° . It is used in the preparation of perfumes of the orchid, clover, and carnation types, and is frequently known under the names of essence of orchid, orchidée, and trèfle.

Terpineol, $C_{10}H_{17} \cdot OH$, is an alcohol existing in several isomeric forms. Solid terpineol, rarely met with, is usually a single body, but the liquid terpineol of commerce, which is used to an enormous extent in perfumery, is always a mixture of at least two isomers, which melt at 35° and 32° respectively, with either some impurity or a third isomer. Apparently, up to the present it is only the isomer melting at 35° which has so far been found occurring in nature. The manufacture of liquid terpineol, of which enormous quantities are consumed, always starts from turpentine oil, either by a process devised by Bertram, or more usually by that of Voiry and Bouchardat, which involves the preliminary preparation of terpin hydrate. This process is as follows. Terpin hydrate is first prepared by mixing 4 litres of turpentine with 3 litres

of alcohol (80 per cent.) and 1 litre of nitric acid (sp. gr. 1.25), and allowing the mixture to stand in a flat open dish in a cool place. At the end of four to six weeks, about 250 grams of colourless crystals of terpin hydrate will be found deposited in the liquid, and eventually the amount will increase to about 1 kilogram. One hundred grams of the terpin hydrate are heated in a flask over a naked flame with 200 c.c. of 20 per cent. phosphoric acid, under a reflux condenser, until it commences to boil. Steam is now passed through the liquid, and a colourless oil distils. Distillation proceeds until no more oil passes over. The oil is then separated, dried over calcium chloride, and rectified by distillation under reduced pressure. Terpinene (boiling at 179–182°) and terpinolene (boiling at 185–190°) are collected first, and crude terpineol collects at 210–218°, which is redistilled and the purified body, boiling at 215–218°, results. Dilute sulphuric acid can be employed in place of phosphoric acid. Terpineol of commerce has a specific gravity 0.933 to 0.941 and boils at 217–220°.

To prepare terpineol by Bertram and Walbaum's process, a mixture of 2 kilos. of glacial acetic acid, 50 grams of sulphuric acid and 50 grams of water, is prepared, and to this is added 1 kilo. of pure turpentine oil, in three successive quantities. The temperature of the mixture rises and the oil gradually dissolves. It is kept cool, so that the thermometer does not rise above 45–50°. When all the oil is added, the mixture is allowed to stand at 30–40° for a time, and is then diluted with water and shaken with a solution of soda. The product so obtained, composed of a mixture of terpenes and terpinyl esters, is purified by distillation with steam, or in a vacuum, then saponified with alcoholic potash, which liberates terpineol. Pure terpineol should be quite free from water and from terpenes, and should therefore yield no distillate below 216°. Minute traces of water are shown by a cloudiness when dissolved in petroleum ether. The products known commercially under the names artificial lilac, lilacine, muguet, syringol, gardeniol, and similar names are merely terpineol, mixed with some small quantity of other perfume material. For example, much of the "muguet" of commerce consists of terpineol with a trace of ylang-ylang oil, or with geraniol.

Terpineol finds many applications in perfumery. It is not attacked by alkali even when warm, so that it can safely be employed in the perfuming of soaps, whether made by a hot or a cold process. It is the base of lilac, lily of the valley, syringa and gardenia perfumes. Combinations of terpineol with helio-

tropin (10–20 per cent.), linalol, caranga oil, geranium oil, ylang-ylang oil, and sandalwood oil give very useful perfume mixtures.

Artificial Ylang-ylang Oil.—The preparation of artificial ylang-ylang oil has been the subject-matter of several patents, most of which have expired. One of the earliest provided for the admixture of benzyl acetate with certain of the compounds existing in the natural oil, namely, cadihene, geraniol, linalol, para-cresol methyl ether, eugenol, and methyl benzoate. The following bodies may also be used to improve the odour: methyl salicylate, *isoeugenol*, methyl eugenol, methyl *isoeugenol*, cresol, benzyl alcohol, and benzyl benzoate. Traces of methyl anthranilate may also be added. The old patent referred to gives the following mixture:—

Linalol	250 grams
Geraniol	130 "
Cadinene	50 "
Eugenol	2 "
para-Cresol methyl ether	10 "
Methyl benzoate	60 "
Benzyl alcohol	150 "
Benzyl acetate	100 "
Benzyl ether	67 "
<i>iso</i> Eugenol	20 "
Cresol	1 "
Methyl <i>isoeugenol</i>	40 "
Methyl eugenol	100 "
Methyl salicylate	20 "
Methyl anthranilate	0.5 "

Various shades of the perfume can be obtained by varying the proportions, or by omitting one or more of the above ingredients.

Cinnamic Aldehyde, C_9H_8O , is the principal odour-bearer of Chinese cassia oil (up to 85 or even 90 per cent.), from which it can be prepared, and of ordinary cinnamon bark oil. It is prepared artificially on a commercial scale by heating a mixture of benzaldehyde (10 parts) and acetic aldehyde (15 parts) with 10 parts of a 10 per cent. solution of pure caustic soda, free from carbonate and 900 parts of water, in a closed vessel to 30° , with frequent agitation. After eight to ten days, the reaction is complete and the mixture is extracted with ether, the ether evaporated, and the product fractionated in a vacuum. The fraction $128-130^\circ$, at 20 mm. pressure, is practically pure cinnamic aldehyde. It is a pale yellow liquid, decomposing on distillation at the ordinary pressure in the air. It boils at $252-254^\circ$, or at $128-130^\circ$ at 20 mm. pressure; its specific gravity is about 1.054. Cinnamic aldehyde has the general characters of cassia oil and to some extent of true cinnamon oil. Its chief value lies in its pale colour and its high perfume value as against the oils which contain from 65

to 90 per cent. of aldehyde. It should be free from chlorine, as when this impurity is present, pale substances perfumed with it have a tendency to darken gradually.

Cinnamic Alcohol, $C_9H_{10}O$, exists in the form of its cinnamic ester (styracine) in balsam of Peru and storax, whence it can be extracted by saponification. The storax is heated to drive off essential oil, and the resinous residue is washed with water. Alcohol is added, which dissolves part of the resin, and leaves part insoluble, so long as it is kept cold. This insoluble residue is crude styracine and is crystallised several times from boiling alcohol. The pure ester forms colourless needles, practically odourless, and melting at 44° . It is insoluble in water, slightly soluble in cold alcohol, but freely soluble in boiling alcohol and in ether. If styracine be boiled with a concentrated solution of caustic alkali, cinnamic acid is set free and distils over in the steam. It forms a colourless oil, sinking to the bottom of the distillation water, and eventually crystallising in long needles. It can be purified by dissolving in ether, filtering, and evaporating off the ether. It forms colourless crystals melting at 33° and boiling at 258° . Its specific gravity is about 1.020. It is but slightly soluble in water. It possesses a very sweet and lasting odour, and is very useful in perfumes of the hyacinth type.

Artificial Cinnamon Oil.—Patents have been taken out for the preparation of artificial cinnamon oil, that of Schimmel consisting in the mixture of cinnamic aldehyde, phellandrene, eugenol, methyl amyl ketone, nonyl aldehyde, cuminaldehyde, caryophyllene, linalol, and linalyl isobutyrate. Further, there may be added, to improve the odour, cymene, benzaldehyde, phenyl-propyl aldehyde, furfural, pinene, and methyl eugenol.

Cinnamic Acid, $C_9H_8O_2$, exists in balsams of Peru and Tolu and in storax. It has only a weak odour, and is principally used to prepare its methyl and ethyl esters, which are very useful in perfumery. It may be extracted from the above-named bodies, or made synthetically.

(a) *Preparation from Storax*.—Twenty parts of storax are distilled with 15 parts of carbonate of soda dissolved in 200 c.c. of water. The essential oil is distilled off, and cinnamate of soda, crude styracine, and resinous matter remain behind. This residue is diluted with water, in which the cinnamate of soda is soluble. The liquid is filtered and cinnamic acid liberated by the addition of hydrochloric acid. The separated crystals are washed with water, dissolved in ammonia, again liberated by hydrochloric

acid, and recrystallised from boiling water, filtering through animal charcoal if necessary to remove colour. The residue undissolved by water contains the crude styracin, as described under cinnamic alcohol.

(b) *Synthetic Preparation*.—Twenty parts of benzaldehyde, 32 parts of acetic anhydride, and 10 parts of anhydrous acetate of soda in powder are heated in a flask on an oil-bath for eight hours at a temperature of 180° . A condenser about 2 feet long is attached to the flask. If the operation cannot be completed in a day, the condenser should be attached to a calcium chloride tube to prevent the absorption of moisture. When the reaction is complete, the mixture is poured whilst still hot into a larger flask, water is added, and a current of steam passed through until all unchanged benzaldehyde has passed over. The remainder, largely diluted with water, is boiled for a short time with a little animal charcoal, and filtered. On cooling, cinnamic aldehyde separates in brilliant tablets. It can be purified by further recrystallisation from hot water. Cinnamic acid forms colourless crystals almost odourless and tasteless, melting at 133° and boiling at 300° . It sublimes without decomposition. It is only slightly soluble in cold water, but freely soluble in boiling water, alcohol, and ether. By heating cinnamic acid with lime at 200° , it yields styrol (styrolene). It also yields the same substance when it is converted by hydrobromic acid into a bromohydrocinnamic acid, and treating the latter with strong alkalis.

• **Methyl Cinnamate**, $C_{10}H_{10}O_2$, occurs in various balsamic substances, but has only been found in one essential oil, namely, that of *Alpinia malaccensis*. It is prepared artificially by heating on a water-bath 1 part of cinnamic acid and 2 parts of methyl alcohol under a reflux condenser. Dry hydrochloric acid gas is then passed into the mixture to saturation, that is, until the gas is no longer absorbed, but passes through the liquid and emerges through the reflux condenser tube. The mixture is then cooled and poured into 20 parts of cold water and the ester extracted with ether. The ethereal solution is dried over calcium chloride and the ether evaporated. The residue is distilled and the fraction 250° to 265° collected and allowed to crystallise. It can be further purified if desired by a second fractional distillation. Methyl cinnamate forms colourless crystals melting at 34° to 36° , and boiling at 262° to 265° . Its odour is penetrating and fruity. It is very useful in perfuming toilet vinegars, dentifrices, etc.

Ethyl Cinnamate, $C_{11}H_{12}O_2$, is found in minute quantities in

storax and in oil of camphor. It is prepared artificially in the following manner. Five hundred grams of pure, dry acetic ether and 23 grams of sodium in small pieces are placed in a 1000 c.c. flask. Into this, 100 grams of benzaldehyde are poured, drop by drop, keeping the flask immersed in a cooling mixture. The reaction takes place quietly. When all the benzaldehyde is poured in, only a small amount of the sodium remains floating on the surface. When this has disappeared completely, 60 grams of glacial acetic acid are added slowly, and finally, 500 c.c. of water. The mixture is then poured into a separator, the aqueous solution of sodium acetate is run off, and the mixture of acetic and cinnamic esters is washed twice with water. This is dried over calcium chloride and rectified.

About 300 grams of acetic ether are recovered at 110° , and a certain amount of unaltered benzaldehyde follows, and at 260° to 275° about 110 grams of ethyl cinnamate distil over. Ethyl cinnamate is an oil at the ordinary temperature, but solidifies on cooling, and melts at $+12^{\circ}$. It boils at 271° and has a specific gravity 1.054. It is a useful substance for blending in soap perfumes.

Methyl Anthranilate.—Recent researches on neroli oil revealed the existence of this ester, which is a most important constituent of the oil in regard to its characteristic odour. It is found in a number of other flower oils, notably in those of tuberose, ylang-ylang, gardenia, and jasmine. This ester is used, in conjunction with the constituents peculiar to given flower oils, to reproduce the odours of the particular flower. It is prepared in various ways, all depending on a synthesis of anthranilic acid, which is then esterified by condensation with methyl alcohol under the influence of dilute mineral acids. It is a liquid, solidifying at low temperatures and melting at 24° to 25° . It has an intense fluorescence.

Methyl-methylantranilate.—Following on the researches on oil of neroli, other investigations were undertaken, in order to discover whether similar nitrogenous esters existed in allied essential oils. Oil of mandarines (or tangerine orange) was one which showed a marked fluorescence, and on examination an ester was extracted from it by dilute sulphuric acid, which was shown to be methyl-methylantranilate. This ester melts at 18.5° to 19.5° and has a specific gravity 1.127. It is prepared synthetically by esterifying methylantranilic acid with methyl alcohol under the influence of a dilute mineral acid.

SYNTHETIC PERFUMES

85

TABLE OF THE PRINCIPAL ARTIFICIAL PERFUMES AND ISOLATES

Single substances.	Mixtures.	Dominant odour.
Acetate, amyl	Acacia	Acacia
„ benzyl		Pear
„ bornyl		Jasmine
„ geranyl		Pine needles
„ linalyl		Wild rose
Acid, cinnamic		Bergamot
„ phenylacetic		Slight balsamic
Alcohol, benzyl		Honey
„ cinnamyl		Floral, slight jasmine
„ phenylethyl		„ slight rose
Aldehyde, anisic		Rose
„ benzoic		Aubepino
„ cinnamic		Bitter almonds
„ decylic		Cassia, cinnamon
„ nonylic		Powerful purity, useful for reproducing neroli, rose, and acacia odours
„ octylic		
Amyl salicylate	Ammandol	Almonds
Anethole	Ambrettol	Ambergris
Aubepine (anisic aldehyde) ...		Orchid, tréfle
		Aniseed
		Aubepine
Borneol	Bergamiol	Bergamot
Bornyl formate		Spike, pine
		Pine needles
Bromelia (naphthol ethyl ether)	Bouvardia	Fancy perfume
Carvacrol		Neroli
Carvene		Marjoram
Carvone		Caraway
Cinnamelin	Cheiranthia	„
Citral		Wallflower
Citronellal	Civettol	Balsam of Peru
Citronellol		Civet
		Lemongrass, verbena
		Citronella grass
Coumarin		Rose
	Clematis	Clematis
		New-mown hay
Ethyl acetate	Crategino	Fancy perfume
„ anthranilate	Dianthine	Clove pink
„ benzoate	Eglantine	Wild rose
„ cinnamate		Fruity
„ salicylate		Neroli
Eucalyptol		Floral
Eugenol		Balsamic
		Wintergreen
		Eucalyptus
		Cloves
		Orris
Fragarol (naphthol butyl ether)	Florentinol	Slight neroli; fixative
Geraniol		Rose
Geranyl acetate		Wild rose
„ formate		Rose-geranium
Heliotropin		Heliotrope
Indole	Heliotropol	„
		Very unpleasant, but va- lable in dilution

TABLE OF THE PRINCIPAL ARTIFICIAL PERFUMES AND ISOLATES (*cont.*)

Single substances,	Mixtures.	Dominant odour.
Ionone		Violet
	Iraldeino	"
	Italia	Orris
	Irisolette	Violet
	Irisone	"
Irone	"	Orris
isoBorneol		Camphoraceous
isoEugenol		Carnation
isoIrone		Orris
isoSafrole		Aniseed
	Iacinth	Hyacinth
	Jasminol	Jasmin
	Jasmino oil	"
	Lavandol	Lavender
	Lilacine	Lilac
	Lilas	"
Linalol		Linaloe wood, useful for many floral odours
Linalyl acetate		Bergamot
Methyl anthranilate		Neroli
" benzoate		Balsamine
" cinnamate "		Balsamic
" salicylate		Wintergreen
Menthol		Peppermint
Menthone		"
Mirbane (nitrobenzene) ".....	Mimosa	Mimosa
	Muguet	Almonds: very crude
Musk ambrette		Lily of the Valley
" ketone		Musk
" xylene		"
	Narceol	Jasmin
	Narcissus (artificial)	Narcissus
	Neroli (artificial oil)	Neroli
Neroline (naphthol ethers) ...		Neroli
Niobe (methyl benzoate)		Balsamic
Nitrobenzene (nirbarc)		Almonds: very crude
Orchidée (amyl salicylate) ...	Ocillett	Cloves; carnation
Reuniol (geraniol)		Orchid; trèfle
Rhodinol		Rose
Safrol		"
Santalol		Sassafras
	Sassafras (artificial oil)	Sandalwood
	Syringol	Sassafras
Terpineol		Syringa: lilac
Terpinolene		Lilac: lily
Thymol		" "
	Tonquinol	Thymo
Vanillin		Tonquin bean; musk
	Vanillone	Vanilla
	Violettone	Benzoin: vanilla
Yara-yara (naphthol methyl ether)		Violet
	Ylang-ylang (artificial)	"
	Zibethine	Neroli
		Ylang-ylang
		Civet

SYNTHETIC PERFUMES

87

The following table gives the amount of a number of artificial perfumes dissolved by 1000 grams of various solvents at the ordinary temperature. Where the figure "1000 grams" occurs, it is to be taken that there is no limit to the solubility, the body is soluble in all proportions.

	90 % alcohol.	Water.	Glycerine.	Olive Oil.	Mineral Oil.	Vaseline at 30°.
Anethole	1000	—	—	1000	1000	500
Aubepine	1000	1	5	1000	10	30
Benzaldehyde	1000	—	10	1000	70	50
Benzyl acetate	1000	—	—	1000	100	50
Benzyl alcohol	1000	100	10	500	5	5
Benzyl benzoate	1000	—	10	1000	180	75
Borneol	500	—	—	100	100	100
Bornyl acetate	1000	—	—	300	5	300
Bouvardia 100 %	500	—	—	500	—	50
Bromelia	40	—	5	20	10	120
Cinnamcin	1000	—	—	1000	7	—
Cinnamic alcohol	1000	—	4	20	—	10
Cinnamic aldehyde	1000	—	—	100	10	10
Citral	1000	—	2	1000	200	200
Citronellal	1000	—	2	1000	200	200
Citronellol	1000	—	—	1000	1000	1000
Civet (artif.)	200	3	5	1000	600	700
Coumarin	100	2	12	20	2	15
Ethyl benzoate	1000	—	—	200	200	100
Ethyl cinnamate	1000	—	—	1000	1000	500
Ethyl salicylate	1000	—	—	1000	1000	500
Eucalyptol	1000	—	—	1000	1000	500
Eugenol	1000	—	5	1000	10	40
isoEugenol	1000	—	—	1000	10	10
Geraniol	1000	—	—	1000	1000	1000
Geranyl acetate	1000	—	—	1000	1000	500
Geranyl formate	1000	—	—	1000	1000	500
Heliotropin	200	1	10	10	10	20
Ionone a	1000	5	10	—	—	50
" b	1000	—	—	1000	1000	500
Irene 100 %	1000	—	—	1000	1000	500
isolrene	1000	—	—	—	—	50
Linalol	1000	—	1	500	500	1000
Linalyl acetate	500	—	—	500	100	500
Menchor	500	—	—	200	200	200
Methyl benzoate	1000	—	—	200	200	100
Methyl cinnamate	500	—	—	500	500	500
Methyl salicylate	1000	—	—	1000	1000	1000
Musk xylene	5	—	—	25	7	—
Orchidee	1000	—	—	1000	100	200
Phenyl ethyl alcohol	1000	20	10	500	5	5
Rhodinol	600	—	4-3	500	—	—
Safrole	1000	—	—	1000	1000	1000
isoSafrole	500	—	—	1000	1000	1000
Santalol	1000	—	—	1000	500	500
Terpineol	1000	—	10	1000	1000	1000
Thymol	2000	—	1	500	50	50
Vanillin	200	8	8	15	1	10
Wintergreen (ess. art.)	1000	—	—	1000	1000	1000
Yara-Yara	20	—	5	20	10	150

PART II

THE MANUFACTURE OF PERFUMED PRODUCTS

CHAPTER III

THE PREPARATION OF AROMATIC WATERS, EXTRACTS, INFUSIONS, AND TINCTURES

HAVING shortly reviewed in the preceding chapters the principal raw materials employed by the perfumer, we may now proceed to examine the methods by which the various articles of the perfume industry are prepared.

But, in the first instance, it is necessary to devote a short space to certain intermediate products which are commonly employed. These products are the liquids known as "aromatic waters," "flower infusions," "flower extracts," etc.

A large number of perfume materials occur in the solid forms, such as ambergris and musk. One is therefore compelled to make extracts of such bodies in order that they may be usefully employed to fulfil the part designed for them. Flower pomades, such as are sold by the perfumery houses at Grasse or Nice, can be used as such in certain preparations, but they have other methods of employment, thanks to the fine odour of the perfume they contain, and, in order to take advantage of this, the perfumer is obliged to extract the perfume before he can use it in many of his compositions.

Aromatic Waters

The employment of aromatic waters in perfumery is more common than is usually believed. They serve to diminish the "rawness" of the alcohol in certain cases, or to reduce the cost price, so as to render them accessible to a wider *clientèle*. They also serve as a vehicle for a certain number of essences used for the purpose of modifying or "rounding off" the principal perfume of a given composition. These aromatic waters can be prepared either by distillation or by simple admixture. In fact,

when speaking of the use of pure water in perfumery, one may often consider the employment of the distillation waters of certain essential oils, which are suitable for use in certain cases. But such waters, especially rose-water, have not always the constant composition required for regular employment. At one time it has been made from one species of rose, at other times from another species; sometimes the flowers have been distilled in one method, sometimes in another.

On account of these drawbacks, many perfumers prefer to prepare their aromatic waters by dissolving a constant small quantity of essential oil in distilled water. The great advantage of this is that they can prepare a uniform product in just sufficient quantity to use at the time, and so avoid deterioration by prolonged keeping. But the preparation of aromatic waters from essential oils is not free from difficulties. For example, most essential oils are almost insoluble in water, and even when dissolved in small quantity may separate, even after filtration, on slight change in temperature. It is best to use terpenless oils and to dissolve them in warm distilled water. The liquids are not so turbid as with ordinary essential oils, and are easier to filter. The oil is dissolved in a little alcohol, the water heated to boiling point, and the alcoholic solution added and the mixture again heated to boiling point with constant stirring, the vessel closed and the contents allowed to cool. The liquid is allowed to stand for three weeks, and then filtered. These waters can also be made in the cold, but they require to stand for a certain time to become properly saturated. The oils are dissolved in a little alcohol, diluted with cold water, well shaken and allowed to stand. It is, however, advisable to add a little filtering powder after the first agitation, and then to shake several times, allow to stand for three weeks and then filter. In order to ensure the keeping properties of aromatic waters, it is useful to add a little boric acid to the water used.

Rose-water may be prepared by dissolving 30 grams of Otto of Rose in 250 grams of alcohol warmed to 60°. This is poured into a vessel—such as a carboy—holding about 45 litres, and 38 litres of distilled water are added. The vessel is well shaken from time to time, until the solution of the oil is complete. The rose-water so prepared is sometimes liable to deteriorate through the carboy being kept tightly corked for too long a period. This is remedied by pouring the aromatic water into vessels in contact with a large air surface some time before use.

Orange-flower water is subject to the same trouble, and can be restored to condition in like manner. It may be prepared by mixing 32 drops of oil of neroli with 4 grams of filtering powder, such as magnesia, in a litre of water. The finished product will naturally depend entirely for its quality on that of the oil of neroli employed, which should be of the best.

If, instead of preparing orange-flower water in the manner described, the perfumer prefers to purchase it from the distillers of the flowers, it is absolutely necessary that he should obtain a clear, transparent liquid, at most with a faint opalescence, almost colourless, of agreeable odour of the orange-flower, and

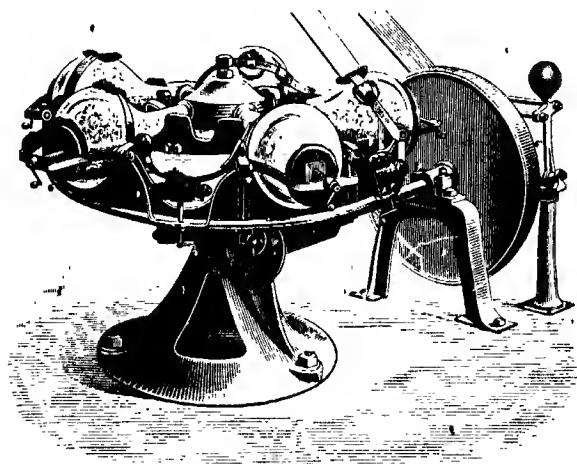


FIG. 2.—Mechanical Agitator for Glass Containers.

of slightly bitter taste. It should not darken with sulphuretted hydrogen. If it darkens it should be redistilled before use. Only pure distilled water should be used in the preparation of these substances. Instead of using carboys and shaking them by hand, one can use a mechanical agitator carrying up to ten vessels of 15 litres each. A small agitator of this type is here illustrated.

This type of apparatus is largely employed for the maceration and rapid exhaustion of substances for infusions in alcohol, or emulsions made in ether, etc. They are found to a considerable extent in the large perfume factories in Paris, and their value is fully established by a considerable saving of time, labour, and capital, a good deal of the latter being necessarily locked up in the stocks of infusions of musk, ambergris, civet, orris, benzoin,

AROMATIC WATERS, EXTRACTS, INFUSIONS, ETC. 91

etc., which it is necessary to keep when made by the old methods. In many cases, such machines render unnecessary transference from vessel to vessel, and so save the loss consequent upon such transference. They are noiseless and require very little attention. Their action is very efficacious, the contents of each vessel receiving up to 150,000 movements in every direction per day. In this way, powdered orris is completely exhausted in four days and musk in ten days. The expense for motive power is very low, the vessels revolving on pivots, so that a state of practical equilibrium is always maintained.

PERFUMED SPIRITS

Perfumed spirits are more indispensable adjuncts to the perfumer than aromatic waters. They may be obtained by distillation, when they are known as distilled spirits, or, to adopt the French name, as "alcoholates"; or by simple maceration, when they are known as infusions, or alcoholic solutions or extracts.

For example, an alcoholic extract of linaloe wood, free from astringent and resinous matter, and having only a faint yellow colour, can advantageously replace ordinary alcohol in the preparation of perfumes of the rose type, thanks to its odour of the rose, and it gives not only a finer perfume, but a more lasting one than plain alcohol. The extract is obtained by a more or less prolonged maceration of the aromatic substance in the appropriate solvent. In the case of most oils, solution takes place at once, but with solid substances fairly long maceration is necessary.

The terms infusion, maceration, and digestion are practically identical, but with this distinction, that they are usually applied to the same operation carried out under varying conditions. It, for example, it is desired to extract from a given substance a non-volatile body soluble in water, the substance will be treated with boiling water. This process is known as infusion. The infusing vessel should be carefully closed, and the substance left in contact with the water for a period varying according to the greater or less solubility of the body to be extracted, in the solvent. In the infusion of dried leaves or flowers, it is best first to moisten them with a little hot water so as to cause them to open or unroll and then add the remainder of the water. This

is the rational method of making tea and medicinal infusions. Better results are obtained thus than by at once adding the whole of the water necessary for the infusion.

Maceration differs from infusion only in the temperature of the liquid, which is always cold. The process, naturally, is longer and often runs into weeks or even months. Substances extracted by this process are those which will not bear a high temperature, and contain very soluble extractives. In certain cases, maceration serves the purpose of softening and disintegrating raw materials before they are distilled. The cells and vessels containing the essential oil are broken open and so more readily yield up the oil. In the manufacture of toilet vinegars, a number of extracts obtained by maceration are employed. Some of the substances employed are so unstable that all other methods would injure them.

Digestion is merely a prolonged infusion in a warm liquid which is not allowed to attain boiling temperature. One usually submits to digestion only those substances which are very slow to yield their perfume to cold alcohol, and for which the employment of heat is indispensable.

Whether extracts are prepared by infusion, maceration, or digestion, they should be kept in vessels which are not attacked by the liquid contained therein, and closely corked in order to prevent evaporation of the perfume. Copper and tin are most suitable for this class of preparation. Stoneware, glass, or enamelware, heated on a water- or sand-bath, are also suitable. Whatever the character of the vessels, the operator should always take care that they are not too full, especially when they have to be heated. In this case, it is necessary to have an opening through which the vapour formed can escape. This precaution is necessary, since by a rise in temperature alcohol increases in volume, and if the lid completely closes the vessel, a vacuum may be formed on cooling, which might cause the vessel to burst. Apart from this, the operation proceeds more satisfactorily when the vessels are not too full.

The substances treated should always be crushed and in such a condition that they present the greatest possible surface to the solvent. Further, they should be repeatedly stirred so as to be in the closest contact with the solvent throughout.

The time of maceration depends upon the nature of the substance to be treated, and the greater or less solubility of its constituents. Perfumes dissolving easily in alcohol may be treated

with an excess of the solvent, so as to shorten the process. An extract so obtained is of fine and sweet odour, whereas those obtained by a digestion or maceration which has been too prolonged are usually sharper and of thicker consistency. In fact, it is generally true that, other things being equal, the shorter the time of the extraction, the better is the extract.

When it is considered that the infusion has been standing sufficiently long, the aromatic liquid is separated from the residue, either by means of a fine sieve or a filter, and the latter is pressed in order to obtain the remainder of the liquid. The mixed liquids, not being quite clear, should be again filtered.

In most cases, the most highly aromatic extracts are obtained by the use of 80 per cent. alcohol, but this, of course, is by no means a fixed rule. Maceration with this solvent is complete in a week at a temperature of 15-20°. If a perfumer is pressed for time, and wishes to shorten the process, he must raise the temperature to 30-35°, and constantly stir the mixture. But in this case, he must allow the mixture to stand some hours, and cool down, before filtering or pressing the residue.

Most extracts improve on keeping, so long as they have been kept in closely sealed vessels, in a place not too warm, and not exposed to the direct action of sunlight, which causes decomposition of the extract. These extracts always show a less percentage content in alcohol than that of the alcohol employed, on account of the amount of the substance added to the alcohol by the extraction, which, of course, increases its bulk.

Tinctures,* as employed in French perfumery, imply the same thing as digestions or infusions, but with the advantage of retaining their odour for a more lengthy period. They also allow an odour which would not stand distillation to be fixed, and they have not the "odour of the still," nor the empyreumatic odour so common in distilled products; and their preparation is economical.

But against these advantages, the colour—often very intense—is a disadvantage which is against the universal use of these extracts, especially as no means of decoloration is known which does not also attack the constituents which have an odour value.

* The term "infusion" is used in this work to include extracts from flower pomades, natural musk, aromatic gum-resins, and similar substances; "solutions" are solutions of natural essential oils and other natural perfumes, whilst "tinctures" are solutions of artificial perfumes. Thus infusion of musk is an extract of natural musk, whilst tincture of musk means a solution of artificial musk.

In some isolated cases, the extracts can be redistilled, either to recover part of the alcohol employed, or to obtain by fractionation more concentrated extracts, or even to give to the distillate a finer aroma, deprived of the disagreeable constituents contained in the original extract.

In conclusion, it may be said that in order to prepare these extracts of the best quality, it is indispensable that the following conditions should be maintained:—

(1) Only use well-dried substances, or, where this is not possible, increase the strength of the alcohol used.

(2) Use the material in the most finely divided state possible.

(3) Do not exceed a temperature of 30-35° in an alcoholic extract.

(4) Keep the vessels well closed.

(5) Prolong the contact of the material with the solvent according to the nature of the substance, and agitate the mixture very frequently.

Some substances naturally contain much water, which diminishes the alcohol strength of the extract, unless they are previously dried. At the same time, it should be remembered that, with certain exceptions, extracts obtained with plants which have been too much dried have not the delicacy of those prepared from the fresh plant.

If the manufacturer desires to prepare distilled alcoholic solutions from these extracts, it is best to distil from a water-bath, as direct fire or a sand-bath usually causes the distillate to have a well-marked empyreumatic odour.

THE PREPARATION OF RAW MATERIALS

The machinery used for crushing the raw materials varies according to the nature of the latter. Seeds are ground in mills; small, woody materials and barks are crushed; and twigs and fine roots cut up by a machine resembling a chaff-cutter; wood is cut into thin shavings. It is not necessary to give detailed descriptions of all these machines, but attention may be drawn to a few typical ones.

Crushing Machines (*Broyeurs*).—A machine suitable for grinding seeds and other small dry material is shown in Fig. 3.

It is a centrifugal crusher with automatic feed, with a closed chamber to receive the powder and a ventilator to assist in avoiding the escape of dust.

Fig. 4 represents a crushing, granulating, and grading mill, with two steel discs, so toothed that progressive grading is possible.

Fig. 5 is a small crusher with three granite cylinders, with a differential movement, for pasty material.

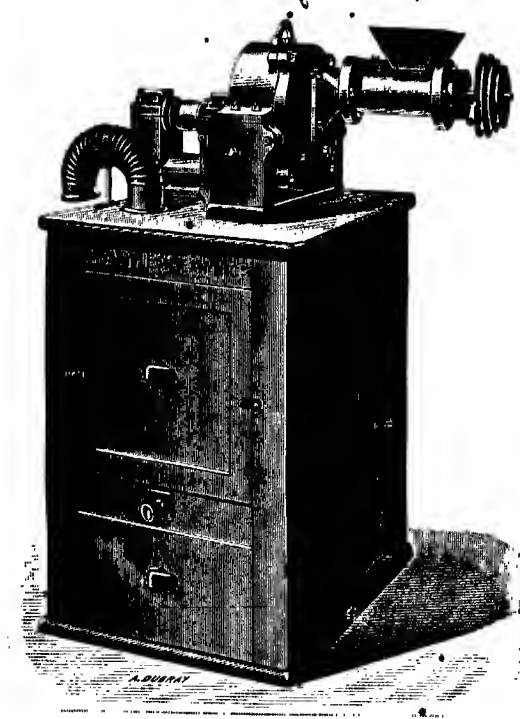


FIG. 3.—Centrifugal Mill for Powdering Dry Material.

Herbs are cut by a machine resembling a chaff-cutter, or by a hand tool consisting of one or more parallel knives screwed on a metallic plate, which is fixed to an iron handle weighted with lead or sand.

To treat wood or heavy roots, a cutter is used when small pieces are desired, or a machine in the nature of a mechanical plane when shavings are wanted.

The cutter has a revolving plate armed with sharp steel

blades, which cut the wood into small pieces. The wood is pushed into position and maintained so, by hand, on an appropriate approach.

For shavings, the apparatus is similar, but the wood is brought into position by a platform driven by a pedal (somewhat resembling a bacon-cutting machine), and the shavings are cut off by the revolving wheel, holding the knives, with which the moving platform is usually parallel.

Mechanical pestles and mortars, illustrated in Figs. 6, 7 and 8, are specially useful in perfumery for powdering hard material.

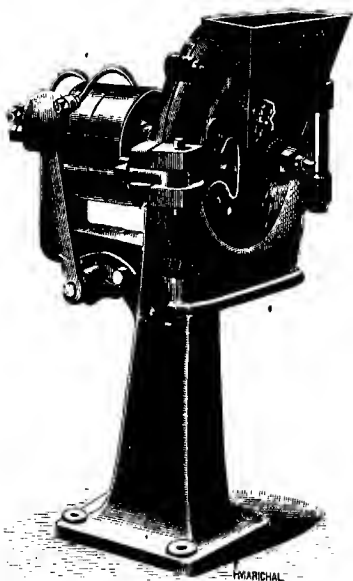


FIG. 4.—Crushing and Granulating Mill.

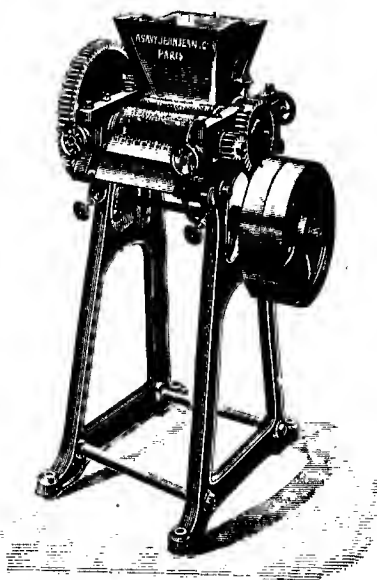


FIG. 5.—Mill for Pasty Material.

Worked by hand, this powdering is long and tedious. The illustrations represent mechanical devices constructed by Messrs. Savy, Jeanjean, & Co., either simple or in groups, which overcome the objections to hand pulverisation. They are mounted on a metal framework and are very suitable for perfumers.

Fig. 7 shows a single pestle, driven by ordinary engaging gear by a belt, occupying but little space, and giving, without any trouble to the workmen, four times the amount that can be obtained by hand work in the same time.

Fig. 8 shows a double pestle and mortar, the pestles armed with sharp knives. It is mounted on a wooden frame, and is

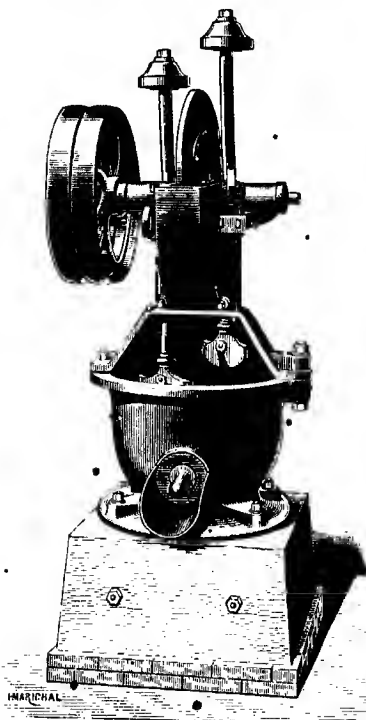


FIG. 6 Mechanical Mortar with Two Pestles.

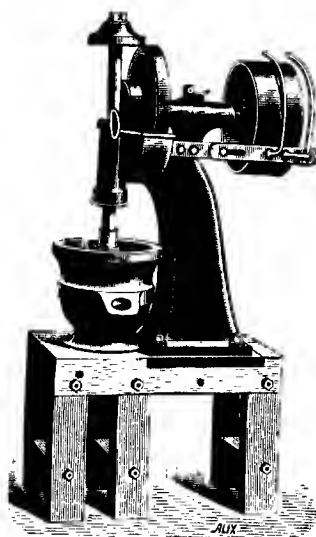


FIG. 7.—Single-pestle Mortar.

worked direct from a belt from the motor, with the usual free wheel for disengaging the machinery. The gear teeth working the pestles are protected with circular metal plates in order to render them safe. The revolving knives of the pestle are of steel. The pestles are subjected to a double movement, rising and falling, and at the same time revolving on their axis, by means of teeth suitably arranged, and so work with great energy on the material to be crushed, and without overheating it. Each of the pestles can be stopped independently and kept up by a small fork inserted into the framework and a groove on the pestle in a corresponding



FIG. 8.—Mechanical Double Mortar.

position. This allows the removal of any material or the emptying of the mortar without the necessity of cutting off the power.



FIG. 9.—Mechanical Sieving Machine.

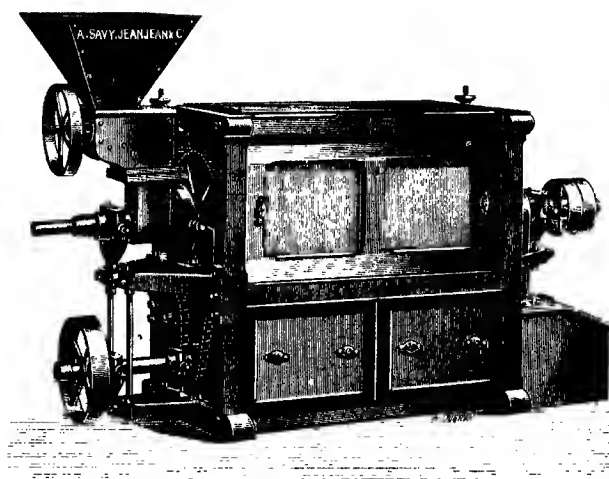


FIG. 10.—Mechanical Sieve with Sieve Chamber.

Indiarubber shields cover the mortars closely, so that powdered material, etc., is not ejected.

Mechanical Sieving.—Sieving, a common manual operation,

is also effected by machinery. Fig. 9 shows a sieving machine made by Messrs. Savy, Jeanjean, & Co., both simple and ingenious, which imitates the movement, so comparatively slow and troublesome, of hand sieving. The machines are made with two, four, or eight sieves to accommodate operations of different magnitudes.

The sieves are constantly agitated, and are subject to a triple movement, which makes them turn in their cages. These are fixed obliquely and set in motion by connecting rods worked by crank shafts on which are mounted fixed and loose pulleys. A metal fork disengages the belt in the usual manner. The sieve drums, with double or triple compartments, can be closely covered by indiarubber covers, kept in place by means of strings and hooks.

These sieves can be replaced by a helicoidal sieve chamber (see Fig. 10), consisting of a cylinder against the surface of which a strip with brushes attached works, so that the material is forced through the sieve. This enables a very high yield to be obtained.

FORMULÆ FOR SIMPLE EXTRACTS

The exact quantities of aromatic material to be used in the preparation of simple or alcoholic extracts may now be given. It should be noted that these formulæ are not to be taken as hard and fast rules, but as good indications of the best starting points for manufacturing purposes.

Infusion of Ambergris

Ambergris	200 grams
95 % alcohol	9 litres

Crush the ambergris, mix with the alcohol, and shake the mixture as frequently as possible, keeping the vessel well closed to prevent loss by evaporation. The time of infusion should be three months, or more, if possible.

Infusion of Ambrette

This infusion may, in certain cases, replace the above-described infusion of ambergris.

Ambrette seeds	200 grams
95 % alcohol	2 litres

Crush the seeds to a fine powder, mix with the alcohol, and leave for three months at least, with frequent shaking.

Infusion of Balsam of Peru

Balsam of Peru	1 kilo.
95 % alcohol	10 litres

Operate as in the preceding case.

Infusion of Storax

Storax	2.5 kilos.
95 % alcohol	8 litres

Operate as in the preceding cases.

Infusion of Balsam of Tolu

Balsam of Tolu	2 kilos.
95 % alcohol	8 litres

Operate as in the preceding cases.

Infusion of Benzoin

Siam benzoin in white tears ...	500 grams
95 % alcohol	3.5 litres

The whiter the benzoin, the better the extract will be.

An alternative formula is

Benzoin (coloured)	600 grams
95 % alcohol	3.5 litres

Powder the resin finely, and allow it to stand with the alcohol, with frequent agitation, for three months.

Infusions of gum resins can scarcely be dispensed with in perfumery. In the manufacture of perfumes for the handkerchief, their chief value lies in their fixative power.

Infusion of Cinnamon

Ceylon cinnamon bark	1 kilo.
95 % alcohol	10 litres

Crush the bark in a mortar, add the alcohol, and shake frequently for a month.

Infusion of Castor

Castor	1 kilo.
95 % alcohol	20 litres

Operate as in the preceding case.

Infusion of Cloves

Cloves	1.5 kilos.
95 % alcohol	7.5 litres

The cloves are crushed or powdered coarsely, and are allowed to stand with the alcohol at a low temperature for five to six

days. This time is sufficient for a good quality infusion. Longer infusion makes the extracts darker and more sharp in odour.

Infusion of Orris

Florentine orris root	3 kilo.
95 % alcohol	4 litres

Three months, at most, for infusion, with frequent shaking. Temperature 35°.

Infusion of Lavender

Lavender flowers	4 kilos.
95 % alcohol	16 litres

Time for infusion, one month at most.

Infusion of Civet

Civet	200 grams
95 % alcohol	4 litres

To prepare infusion of civet, one may proceed in the same manner as for infusion of musk, but this is really not necessary, as the odorous constituents of civet are very soluble in warm alcohol, and advantage may be taken of this fact. For this purpose, a tinned iron vessel is used, which is surrounded by an outside metal jacket with a tap at the bottom to run off the liquid used for condensing purposes. This outer jacket should only surround the top portion of the vessel, and is filled with iced water to prevent the evaporation of alcohol from the lower part of the vessel. The civet is spread on small pieces of filter-paper or small glass plates and placed in the vessel with the alcohol. The vessel is placed on the water-bath so that its contents are heated to 60°, and the mixture is frequently stirred with a wooden spatula. The vessel is removed from the water-bath closed, and allowed to stand for several days with frequent shaking, after which the liquid is filtered.

Infusion of Coriander

Coriander seed (well crushed) ...	5 kilos.
95 % alcohol	22.5 litres

One month's infusion is sufficient.

Infusion of Frankincense

Frankincense	250 grams
95 % alcohol	2 litres

Proceed as in the last case.

Infusion of Mousse de Chêne (Oak-moss)

Mousse de Chêne	150-250 grams
95 % alcohol	10 litres

Reduce the oak-moss to powder and keep the mixture of this and the alcohol well shaken for at least two days (in a mechanical shaker, for preference). The infusion is then filtered, and is most useful in modifying the perfume of other extracts. It gives to many perfumes a “*cachet*” much appreciated by users of perfumes. At the same time, it acts as a powerful fixer and brings out the virtues of other perfumes. Concrete or semi-concrete essences of oak-moss are commercial articles, as are also artificial mixtures claiming to resemble the natural substance.

Infusion of Patchouli

Patchouli leaves	5 kilos.
95 % alcohol	50 litres

Moisten the leaves with 5 litres of the warm alcohol, then add the remaining 45 litres of cold alcohol, and allow the mixture to digest for two to three months with frequent shaking.

Infusion of Cinchona

Cinchona bark	5 kilos.
95 % alcohol	20 litres

Whatever variety of cinchona bark is used, the method of preparation is the same. The bark is finely crushed, and allowed to stand in contact with the alcohol for ten to fifteen days at most.

Infusion of Sumbul

Sumbul root (crushed)	1 kilo.
95 % alcohol	2 litres

Proceed as in the previous case.

Infusion of Sandalwood

Sandalwood (in shavings)	2.5 kilos.
95 % alcohol	15 litres

Allow to stand for two months.

Infusion of Musk (Grain)

Grain musk	33 grams
95 % alcohol	7 litres

The musk is finely powdered with an equal quantity of sugar of milk in a slightly warmed mortar. Two hundred grams of a solution of potassium carbonate and 300 grams of alcohol are

then added and the mixture rubbed into a cream. The remainder of the alcohol is then added, the whole well stirred, and allowed to settle. The particles which have not been sufficiently powdered settle quickly to the bottom; the liquid is decanted and the coarser particles are subjected to a second trituration until they are completely powdered, and the extract is made up to 7 litres if any alcohol has been lost by evaporation. A few drops of ammonia are added, and the mixture is allowed to stand, with periodical shaking, for at least three months.

Better results, however, can be obtained if a percolator be used and the first percolate returned to the percolator four or five times. A product of great delicacy is obtained in this manner. One litre of alcohol is used for 35 to 40 grams of musk, so that the extract is a stronger one than that described above. After the first litre has been obtained by 5 repercolations, a second quality extract is yielded by repeating the treatment, and after this a third quality, but the last named is generally used as if it were alcohol, to start operations again on a fresh portion of musk.

Infusion of Musk (Pod)

Musk, in pods	450 grams
95 % alcohol	17 litres

Operate as above described, remembering that the pods are difficult to soften and cannot be reduced to powder in a mortar. It is best to cut them into as small pieces as possible and soften them by a prolonged treatment in a little alcohol with the addition of a little caustic potash solution at 40–45° in a closed vessel.

Infusion of Myrrh

Myrrh in tears	500 grams
95 % alcohol	6 litres

Proceed as in the case of benzoin.

Infusion of Opopanax

Opopanax	500 grams
95 % alcohol	8 litres

Proceed as in the preceding case.

Infusion of Vanilla

Mexican vanillas	600 grams
95 % alcohol	2 litres

The vanilla is split and cut in as small pieces as possible. It is then mixed with its own weight of sugar of milk and triturated

until a homogeneous paste is obtained. It is then added to the alcohol and allowed to digest for a month or more. This extract cannot always be used in perfumery on account of its more or less intense colour. It may to some extent be replaced by a solution of vanillin or by the following extract, which has little colour, but which is not often used in perfumery.

Infusion of Tonquin Beans

Tonquin beans	1 kilo.
95 % alcohol	5 litres

The beans should not be too old, the fatty matter present in the older beans being very liable to turn rancid. The beans are crushed and macerated for from fifteen days to three weeks. This infusion is, in any event, somewhat liable to acquire a rancid odour, and is not often used.

Infusion of Vanillons

Vanillons	5 kilos.
95 % alcohol	21 litres

Proceed exactly as with vanilla.

Infusion of Vetivert

Vetivert root	1 kilo.
95 % alcohol	10 litres

Reduce the vetivert to as fine a powder as possible, moisten it with a little warm alcohol, and then add the remainder cold. Shake frequently and leave for at least a month.

Infusions of Pepper or Pimento

White pepper, or pimento	1 kilo.
95 % alcohol	5 litres

Break the berries as finely as possible in a mill, moisten with a little warm alcohol, add the remainder of the alcohol, and leave for at least a month.

Infusion of Bois de Rose

Bois de Rose	1 kilo.
95 % alcohol	5 litres

Cut the wood as finely as possible and allow to digest in the alcohol for a month.

FORMULÆ FOR PERFUMED SPIRITS

Under this name are understood preparations obtained by infusion, maceration or digestion with alcohol, with later additions of water, and finally, by distillation, in which process only the fractions with the finest and most delicate odour, are collected.

The addition of water facilitates the recovery of the whole of the alcohol and assists the inert or objectionable resinous and extractive matters to remain as precipitates in the residue in the still.

In these distillations, the first runnings and the tailings are collected separately and used for such purposes as the perfumer may find possible. The alcoholic extracts, the main portion of the distillates, are the most valued products, and are, of course, very expensive. They are prepared, for example, as follows:—

Spirit of Benzoin

Benzoin	1·5 kilos.
95 % alcohol	25 litres
Water	10 „

After digestion with the alcohol, the water is added and the mixture distilled and the fractions collected are:—

First runnings	1 litre
Spirit of benzoin	20 „
Tailings	4 „

The aqueous residue left in the still can be used for the preparation of cheap perfumed waters.

In the same manner, the spirits of myrrh, balsam of Tolu, rosewood, sandalwood, and saffrafras can be prepared.

Spirit of Cinnamon

After maceration of 750 grams of cinnamon bark in 25 litres of 95 per cent. alcohol, and the addition of 10 litres of water, the distillation should give 1 litre of first runnings, 20 litres of spirit of cinnamon, and 4 litres of tailings.

Spirit of Lemon

The peels of 150 lemons are macerated in 25 litres of 95 per cent. alcohol and 10 litres of water added. Distillation gives 1 litre of first runnings, 20 litres of spirit of lemon, and 4 litres

of tailings. The spirits of orange and citron are prepared in the same manner.

To prepare a stronger spirit double the number of the peels in question may be used.

Spirit of Orange-flowers

Macerate 6.5 kilograms of orange-flowers in 25 litres of 95 per cent. alcohol, add 15 litres of water, and distil. One litre of first runnings, 20 litres of spirit, and 4 litres of tailings are obtained.

Spirits of hyssop, lavender, balm and cloves may be similarly prepared. For spirit of roses, double the weight of flowers, namely, 13 kilograms, should be employed.

Spirit of Roses, from Otto

Otto of rose	250 grams
95 % alcohol	50 litres

Spirit of Portugal from Oil

Oil of sweet orange	1225 grams
95 % alcohol	15 litres

Pomade Infusions

A certain number of infusions in common use are made from pomades and enfleurage oils, such as jasmine, jonquil, tuberose, acacia, rose, carnation, lilac, and orange-flower.

The pomades used for this purpose ought to be those known in commerce as "flower pomades Nos. 12, 24, 36, or 72." Pomade No. 72 indicates that most highly saturated with the perfume.

Ten kilos of the pomade are melted on the water-bath, and when semi-fluid are transferred in small quantities to a suitable receptacle in which has been placed 10 litres of 95 per cent. alcohol. The mixture is well stirred until it is completely cold. Care must be taken to close the receptacle thoroughly to avoid loss by evaporation. The mixture is well stirred every day so as to enable the alcohol to dissolve out the perfume from the pomade. At the end of a month, the liquid is poured off and filtered. This is known as the "infusion première." The residue is treated again with 1 litre of fresh alcohol and the "infusion seconde" obtained, and, in the same manner, a litre of "infusion troisième" is yielded. The second and third infusions, although weak, can still be employed in certain cheaper

AROMATIC WATERS, EXTRACTS, INFUSIONS, ETC. 107

products. On the manufacturing scale, these extracts are prepared more rapidly with special apparatus which need not be here described.

The extracts of flower pomades or oils have the disadvantage of containing a small quantity of the fat, which is deposited in cold weather and renders the liquid turbid. To avoid this inconvenience, they are filtered when cold, then kept in a freezing mixture for twenty-four hours, and again filtered. In spite of this, they retain a trace of fatty acids which slightly interferes with the perfume and does not improve the keeping quality of the extract.

The following are examples of these extracts:—

Infusion of Orange-flowers

Orange-flower pomade	1 kilo.
95 % alcohol	1 litre

Proceed as above described. The extract so prepared has a very beautiful perfume indistinguishable from that made from the fresh flowers.

Infusion of Jasmine

Jasmine pomade	1 kilo.
95 % alcohol	1 litre

Proceed as described above.

Infusion of Jonquil

Jonquil pomade	1 kilo.
95 % alcohol	1.25 litres

Proceed as above described.

Infusion of Mignonette

Reseda pomade	900 grams
95 % alcohol	1 litre

Proceed as described above.

When the oil is employed instead of the pomade, it is necessary to stir the mixture for two hours before allowing the oil to separate.

Infusion of Tuberose

Tuberose pomade	1 kilo.
95 % alcohol	1.25 litres

Proceed as described above. To the filtered extract add 20 grams of infusion (tincture) of storax as a fixer.

Infusion of Violets

Violet pomade	1 kilo.
95 % alcohol	1.5 litres

Proceed as described above. To the filtered extract add 50 grams of infusion (tincture) of orris root and 80 grams of spirit of cassie flowers.

Infusion of Nasturtium

Nasturtium pomade (*pommade de capucines*) is an interesting novelty, and is useful in the preparation of extracts of lily of the valley and lilac.

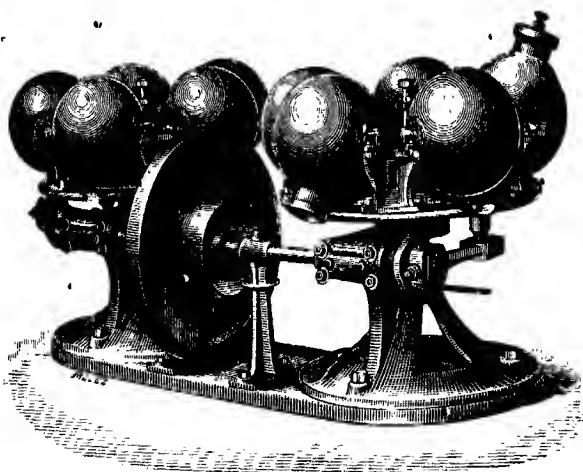


FIG. 11.—Mechanical Agitator.

It has been mentioned that on the manufacturing scale specially constructed apparatus is employed for the above operations, which allow the working up of large quantities at a time with much saving of hand labour.

Mechanical Agitator for Extracts.—This apparatus is so constructed that the matter treated is subjected to very energetic agitation, which assures the closest contact of the substance and the solvent, resulting in a perfect extraction. A rotatory movement of the blades of the vertical shaft in the vat is combined with an up-and-down movement by means of teeth fixed on the main shaft. The vats or cylinders are of copper, holding about 60 to 100 litres each, with well-fitting stoppers. A grating perforated with small holes forms a false bottom and serves to

filter the extract roughly, which is run off through the emptying tap.

To charge the apparatus, the pomade is run into the vessel from a small press containing it, so that in working the screw of the press the pomade is forced through in pipes like vermicelli into the alcohol in the container. Fig. 11 shows two shaking machines coupled and fixed on one pedestal. Each table carries five copper receptacles, tinned inside, each holding 50 litres. These receptacles are mounted on turntables, and swing over for filling and emptying. They are closed by tightly fitting stoppers.

It is easy to understand the working of this apparatus. The horizontal shaft carries the main pulley, and the fly-wheel works by means of crank plates on its edge, connecting rods with socket heads which impart a movement to the table so that it describes a portion of a circle. The return stroke brings the table back sharply into its original position, and so produces energetic shaking, thanks to the rapidity of the movement. This movement is kept regular by means of a governor attached to the fly-wheel.

The fatty residues from the extracts always contain a little perfume, however well they are exhausted. These are used either in soap perfumery or for a further preparation of pomades.

ABSOLUTE CONCRETES AND LIQUID ESSENCES FOR PREPARING INFUSIONS BY SOLUTION IN ALCOHOL

In order to avoid the inconveniences inherent to the preparation of infusions from pomades, the use of the so-called "concretes" and "absolutes" has become more common. These perfumery materials are extracted from flowers, etc., and have the true odour of the fresh material. As they are freed from the wax, etc., existing in the raw material, it is possible to dissolve them almost entirely in alcohol. Examples of such wax-free concretes are those of rose, violet, acacia, orange-flowers, tuberose, jonquil, mimosa, and Mousse de chêne. Three infusions or extracts can be prepared from them, exactly as in the case of flower pomades:—

Wax per concrete	1 kilo.
95 % alcohol	70 litres

The concrete is triturated with 3 litres of the alcohol in a mortar until a homogeneous mass is obtained, when the remaining

67 litres of alcohol are added. The mixture is then treated in the same way as in the case of flower pomades. It is filtered, submitted to the temperature of a freezing mixture and again filtered. Such infusions or extracts are of exceedingly fine odour. They are entirely free from the fatty odour often noticeable in pomade infusions. A second and a third extract are prepared from the residue in the same way as in the case of pomade extract.

Solutions of natural liquid perfumes are prepared by simply dissolving them in 95 per cent. alcohol, filtering, if necessary. For example :—

Solution of Otto of Roses

Otto of rose	20 grams
95 % alcohol	1000 c.c.

Solution of Oil of Vetiver

Oil of vetiver	60 grams
95 % alcohol	1000 c.c.

Solution of Liquid Oil of Orris

Liquid oil of orris	80 grams
95 % alcohol	1000 c.c.

In the same way solutions of semifluid or concrete oils are prepared, and also those of essential oils which are so expensive that only minute quantities are used, and which would be difficult to weigh exactly.

For example, it is much easier to measure 25 c.c. of a solution of Otto of Rose, than to weigh out 0.5 gram.

Solution of Concrete Oil of Orris

Concrete oil of orris	30 grams
95 % alcohol	1000 c.c.

Solution of Orris Resinoid

Orris resinoid	100 grams
95 % alcohol	1000 c.c.

Solution of Carnation Resinoid

Carnation resinoid	140 grams
95 % alcohol	1000 c.c.

Solution of Patchouli Resinoid

Patchouli resinoid	100 grams
95 % alcohol	1000 c.c.

Solution of Sandalwood Resinoid

Sandalwood resinoid	90 grams
95 % alcohol	1000 c.c.

Solution of Vetiver Resinoid

Vetiver resinoid	100 grams
95 % alcohol	1000 c.c.

These resinoids are residues of extracts from the raw material, which contain the essential oil and resins, from which most of the essential oil has been distilled. They contain the resins, with some of the essential oil, and are excellent fixatives. They are employed in soap perfumery, dissolved in the essential oils used as the principal perfume.

The infusions (first, second, and third), obtained as described, from enfleurage pomades are not so largely employed to-day as they used to be. They are, however, almost indispensable for the preparation of the majority of the finest triple and quadruple extracts: for the simple and double extracts they are generally replaced by solutions of the absolute oils or essences.

Solution of Broom (Genêt)

95 % alcohol	1000 c.c.
Semi-solid essence of broom ...	10 grams

The absolute essences are known under numerous names, one of which is the aromanthemes. They are pure natural products, without any addition of synthetics, and are composed of the odorous principles of the flower in a pure and highly concentrated form. They are very useful and faithfully reproduce the flower odour. Alcoholic solutions remain clear and do not precipitate, even when exposed to low temperatures. Concrete essences of all substances generally used for the preparation of perfume infusions are manufactured, but the absolute natural oils of the aromantheme type are restricted to a small number of perfumes, such as acacia, orange-flower, jasmine, jonquil, and hyacinth. They are dissolved in various proportions according to individual taste: for example, 34 grams of the essence in 20 litres of pure 95 per cent. alcohol is a fair average strength.

TINCTURES OF SYNTHETIC PERFUMES

The method of using synthetic perfumes is very simple. It is sufficient merely to dissolve them in a given quantity of alcohol (or rarely some other solvent). The vendors will always supply details as to solubility, for, in the case of synthetic mixtures, the solubility of different perfumes under practically the same name

will vary, which, of course, is not the case when dealing with individual substances. In general, it is best to prepare such solutions and leave them for some days at a low temperature, before use, so as to allow them to mellow. Tinctures prepared from artificial perfumes ought to have a strength corresponding with the previously described "infusions premières." They can then be diluted with alcohol as required for various finished articles. Artificial essences of jasmine, acacia, gardenia, orange-flowers, reseda, tuberose, and violet are usually dissolved in the proportion of 10 grams per litre of 95 per cent. alcohol, whilst in those of hyacinth, heliotrope, and lily of the valley, the quantity varies from 30 to 40 grams per litre. For artificial musk, the quantity is 15 grams per litre, and for artificial civet 50 grams. These figures may, of course, be varied. Artificial civet is obtainable in a solid and in a liquid form. When liquid, it can be added direct to perfume products, without making it into an alcoholic solution.

There scarcely exists any natural perfume which has not, to a greater or less extent, its synthetic counterpart. It would therefore appear easy to prepare any perfume whatsoever by simply mixing synthetic perfumes and diluting them to the proper concentration. This, however, cannot be done in so simple a manner. Artificial perfumes obviously present great resources to the manufacturers of cheap extracts, but in the manufacture of fine perfumes they can only serve as adjuncts to natural perfumes, either to vary the "shade" or "note" of the odours, or to increase its intensity.

Take, for example, the violet perfume, which has been so fully investigated. A violet perfume is obtained by merely dissolving ionone in alcohol. But such a tincture of ionone does not possess the fine odour of an extract made from a natural violet pomade. It has a crudlty and pungency which at once betray its origin. It is therefore always necessary to use the pomade extract of violets when manufacturing a fine violet perfume, and tincture of ionone should only be added to strengthen the natural odour of the flower, an addition which produces excellent results.

But ionone should be employed with care and discretion. Used in too large a quantity, it may "paralyse" the olfactory nerves. It has been said that the Germans have become so accustomed to the powerful ionone odour that they can no longer detect the natural perfume of the violet flower. This is doubtless an exaggeration. But the case of workmen engaged in the manufacture of ionone is characteristic; at the end of a certain time

they lose completely the sense of smell, and only regain it after remaining in the open air for a while. Attention should be drawn to certain other artificial perfumes, such as jasmine, acacia, hyacinth, heliotrope, etc. These are usually of very good quality and can be employed for the manufacture of products which must have the particular flower perfume more or less accentuated. But they can only serve as adjuncts to, and not substitutes for, the natural perfume. As mentioned previously, it is usually sufficient to dissolve 10 grams in a litre of 95 per cent. alcohol to obtain tinctures comparable in strength with the first infusions obtained from the corresponding flower pomade. In regard to artificial essence of hyacinth, care should be taken not to use too much, or the olfactory nerves may be deadened. The more dilute this perfume is, the more delicate it becomes. The tinctures corresponding to the first infusion, then, are obtained by dissolving 15 to 20 grams of absolute liquid or concrete essence in 1 litre of 95 per cent. alcohol. Those corresponding to the second infusion are made by dissolving 6 to 8 grams in the same quantity of alcohol: and those corresponding to this third infusion by using 3 grams per litre. In using the concrete essences, attention has already been drawn to the method adopted. For liquid essences, the oil is simply dissolved in the alcohol. The vessel in which the essence is weighed should be rinsed with alcohol, which is added to the main solution, and the whole is filtered.

One usually only prepares a single tincture of artificial perfumes, equal in strength to the first infusion of a pomade, and this is dissolved in more alcohol as required in the manufacture of various bouquets, etc.

The following concentrations of artificial flower perfumes are of useful standard strength. The figures are in grams per litre:—

Acacia, gardenia, wallflower, jasmine, reseda, orange-flower, tuberose, rose	10
Violet	12
Carnation	115
Heliotrope	32
Hyacinth	40
Lily of the valley	30
Syringa	60

Other tinctures of artificial products are prepared similarly.

Tincture of Musk (Artificial)

Artificial musk	15 grams
95 % alcohol	1 litre

As there are several distinct artificial musks of varying solubility, it is not easy to prepare a tincture equal in strength to that of the infusion of natural musk. The solubility varies from about 6 to 15 per 1000, according to the artificial musk used. It is therefore of importance to know which musk one is using, and to make experiments as to its solubility.

Among other solvents for artificial musk is benzoyl cinnamate or cinnamein. This body is also sometimes known as essence of Peru balsam, in which it exists to the extent of about 45 per cent., and from which it can be separated by means of petroleum ether, benzene or ether. It is an oily liquid having an odour of Peru balsam. Its use is indicated when the odour is required without the colour of Peru balsam. Cinnamein is of considerable interest to the perfumer on account of its high solvent power on artificial musk, without allowing it to be redeposited, as is the case with many essential oils. Benzyl benzoate, which has but a slight odour, is also an excellent solvent for artificial musk.

When artificial musk is used for soap perfumery, it is usually dissolved in the other perfumes, preferably slightly warmed. But if more than small quantities are dissolved, the musk will separate out on cooling and sink to the bottom of the liquid, and if the container is not transparent, may escape the notice of the operator. Besides, warming delicate perfumes is not to be recommended where avoidable, as it injures the odour and promotes evaporation.

Experience has shown that cinnamein can hold a large amount of artificial musk in solution, and it can be employed in most soap perfumes without any inconvenience. Its odour is practically covered by the musk. The stability of solution of artificial musk in cinnamein allows unlimited quantities to be prepared and kept in stock. The cinnamein is heated to 40-50°, and as much artificial musk as will dissolve is added. If any separates on cooling, it can be filtered off and used for a further quantity of solution. The musk will now remain in solution and does not separate by the addition of most essential oils. The solution is useful for perfuming toilet soaps.

When dealing with other substances than toilet soap, the perfumer should use benzyl benzoate, instead of the cinnamate, as the solvent for artificial musk. It is colourless, almost odourless, and soluble in all proportions in alcohol. One kilo. of benzyl benzoate, preferably warmed, can dissolve about 200 grams

of artificial musk and keep it in solution when cold, even after the addition of flower essences, alcohols, etc.

The solubility of artificial musk obviously varies according to the particular musk employed. In dissolving 200 grams of artificial musk in 1 kilo. of benzyl benzoate, a saturated solution is obtained which mixes with alcohol in any proportion without depositing crystals of musk. This solution can be used in perfuming most extracts, toilet waters, etc.

To dissolve artificial musk in benzyl benzoate, the solvent should be heated to 40° and the musk added and well shaken, the temperature being maintained at 40°. The musk soon dissolves to a clear solution. Higher concentrations can be obtained, but they will precipitate when mixed with alcoholic solutions, but they can be used for soap perfumery. Mixtures of 500 grams per kilogram of the solvent solidify, and are useless except for immediate use in particular cases. A temperature of 40° does not affect the qualities of either the musk or the solvent, although at this temperature natural perfumes are affected and alcohol is evaporated.

Tincture of Civet

Artificial civet	40 grams
95 % alcohol	1 litre

This tincture corresponds in strength with an infusion of natural civet of 35 per cent. strength. It has a reddish colour, but, considering the quantity in which it is used, this is no disadvantage. Artificial civet is supplied in the solid and in the liquid forms. As previously mentioned, in the liquid form it may be added directly to the perfume mixture.

Artificial musk is not identical in odour with natural musk, although it closely resembles it. But artificial civet is so close to the natural perfume in odour that the only difference to be noticed is the stronger odour of the artificial perfume as compared with natural civet.

To perfume toilet soaps, the tincture of civet is added to the other essential oils. In the same way, tincture of civet is added to floral extracts, etc. To obtain a perfume of equal intensity, it is necessary to employ about 150 grams of artificial civet in place of 100 grams of natural civet.

Tincture of Ambergris.

Artificial ambergris	50 grams
95 % alcohol	1 litre

Tincture of Ambrethol

Ambrethol	15 grams
95 % alcohol	1 litre

This solution is saturated. It is not of great value, and may be well replaced by an infusion of the natural perfume.

Tincture of Mousse de Chêne

Concrete essence of oak-moss (artificial)	5 grams
95 % alcohol	1 litre

This solution is employed in the manufacture of perfumes for the handkerchief.

Tincture of Vanillin

Vanillin	20 grams
95 % alcohol	1 litre

Tincture of Bourbonal

Bourbonal (vanilla odour)	15 grams
95 % alcohol	1 litre

Tincture of Coumarin

Coumarin	15 grams
95 % alcohol	1 litre

Tincture of Heliotropin

Heliotropin	20 grams
95 % alcohol	1 litre

Tincture of Turanol

Turanol (mixture with flower odour)	30 grams
95 % alcohol	1 litre

The following tinctures of artificial perfumes are, when values are normal, about equivalent in cost to the corresponding first infusions of pomades.

Tincture of Jasmine

Artificial jasmine oil	20 grams
95 % alcohol	1 litre

Tincture of Acacia

Artificial acacia oil	15 grams
95 % alcohol	1 litre

Tincture of Rose

Artificial otto of rose	18 grams
95 % alcohol	1 litre

AROMATIC WATERS, EXTRACTS, INFUSIONS, ETC. 117

Tincture of Neroli

Artificial oil of neroli	40 grams
95 % alcohol	1 litre

Tincture of Violets

Ionone	10 grams
95 % alcohol	1 litre

Tincture of Violet Leaves

Artificial oil of violet leaves	12 grams
95 % alcohol	1 litre

The oils are dissolved in the alcohol, and filtered, if necessary, before use. Irisollette, a fancy name for one of the 100 per cent. violet ketones or mixtures of ketones, in the proportion of 40 grams to the litre of alcohol, gives a fine result, and is of very high strength.

Tincture of Yara-yara

Yara-yara	50 grams
95 % alcohol	3 litres

Yara-yara and bromelia are, as has been mentioned previously, ethers of β -naphthol, and are both artificial neroli perfumes. They are largely employed in soap perfumery, when they are often dissolved in amyl acetate or a mixture of that body with terpinol, which dissolves a considerable amount of either ether. The liquid is warmed and the crystals of yara-yara are added, and when dissolved the perfume is added before it cools, as otherwise crystals may separate. The solution is, therefore, only made when required for use.

Before concluding this chapter a few observations on filtration, an operation of constant employment in perfumery, will be of interest.

FILTRATION

Filtration consists in freeing a liquid from the solid bodies it holds in suspension. This operation is of the greatest importance in perfumery, since the products have usually to be clear and perfectly transparent, and it is unusual to arrive at this result without filtration. To remove the turbidity from liquids, they are passed through a filter, usually made of paper. Oils and substances difficult to filter, such as aromatic waters, are often filtered through felt or other tissues.

The filter paper is placed in a funnel, which should be reserved

for its own purpose entirely; the best types for perfumery purposes are made of glass, the inside being ridged and grooved so that the filtered liquid can easily drain away. Zinc funnels are also used, and instead of the interior being grooved, a basket of iron wire fits inside, and allows the liquid to drain away by the space between the filter paper and the funnel wall.

The only practical shape of this type of filtering funnel is that of an inverted cone, the inclination of the sides being about 60° . It is held in position by specially made stands in order to facilitate manipulation and guard against loss by spilling. Various substances are used as filtering material, principally filter paper, white by preference. Special paper is obtainable for filtering resinous liquids, such as solutions of gum resins used in perfumery. This paper is rather thinner than that used for ordinary liquids and requires more delicate manipulation. The liquid should not be poured right into the filter, as may be done with ordinary paper, but should be poured down the side.

Filtering "thimbles" or "pockets" are also made in paper and are very useful for filtering fatty oils, as they have no seams and can be fitted into any funnel of the right size and shape for filtering at a temperature of 60° .

In some laboratories, where one has to deal with light coloured precipitates, black filter paper is used, as the least traces of white matter are visible thereon, and it is easier to see that the precipitate is completely eliminated from the liquid.

For filtering liquids low in alcohol content, a linen strainer is sometimes employed, as it will frequently hold the impurities better than paper.

For liquids very difficult to filter a felt strainer exactly fitting the funnel is often used.

There are, however, a large number of perfumery products which cannot be clarified by a simple filtration, and one is obliged to use some substance to assist the process. In the simplest cases one uses magnesium carbonate, talc, kaolin, kieselguhr, or even a filtering block of asbestos. In very difficult cases albumen is used, but only when all other means fail. The best way to use these filtering powders is to rub a little into a thin cream with the liquid to be filtered, and pour it all over the interior of the filter paper, etc., and return the liquid passing through the paper to the filter until it runs bright. In certain cases this method (or shaking the powder with a little liquid in a bottle) is inapplicable, as occasionally the powder, once mixed so intimately with the

liquid, will not separate again completely. It is then better to dust the surface of the paper with the powder and then pour the liquid on.

If one dissolves essential oils and synthetic perfumes in 95 per cent. alcohol, the solutions are usually clear and transparent. But there are exceptions, as certain oils give turbid solutions. Simple filtration through paper usually suffices to clarify such turbid solutions, without the use of filter powder, especially if the paper be first moistened with pure alcohol. If these solutions are strongly diluted with water, they deposit oily or resinous matter and become opalescent and cloudy. Terpenes and sesquiterpenes contained in essential oils are also thrown out of solution when much water is added, and give an opalescence to the solution. It is for this reason that terpene oils are advantageous when dealing with solutions weak in alcohol.

To clarify opalescent solutions, it is necessary to use a little filtering powder such as carbonate of magnesia on the filter. But when such an opalescent solution is diluted by further addition of water, the filtration becomes more and more difficult to filter with each degree of dilution, and either talc or kaolin must be used on the filter. For perfumes weak in alcohol, it is preferable to use a felt filter in which a little asbestos is used to assist clarification.

Filtration with animal charcoal in order to decolorise a solution is not recommended for perfumery, as alterations are often produced in the filtrate by oxidation. It is better, when it is impossible to replace a badly coloured liquid (obtained, for example, by carelessness), to use oxalic acid as a decoloriser, especially when the liquid is poor in alcohol. It often suffices to add a few drops of a concentrated solution of this acid to effect decolorisation; this addition is so slight that it does not affect the perfume of the liquid to any observable degree. But with very delicate perfumes, it is best never to resort to this plan.

It is sometimes necessary to separate fatty oils from alcohols, as, for example, in the manufacture of brilliantines. Here one uses a separating funnel, that is, a funnel furnished with a tap at its lower end, allowing any desired portion of the liquid to be run off. The mixture of alcohol and fatty oil is poured into the funnel and allowed to stand for some hours, until the oil, having the higher specific gravity, separates into a lower layer, leaving the lighter alcohol floating on the surface in a sharply defined layer. The tap is then carefully opened and the oily liquid run

off. There are always a few drops of oil left in the alcoholic layer, and in order to eliminate these the liquid is filtered through paper. For this purpose, a wad of cotton wool is placed at the top of the neck of the funnel and the folded paper put in its place and the liquid poured on to it. Any oil drops passing through the paper will be retained by the cotton wool. If one has to separate volatile liquids, a stoppered glass separator should be used. The method of fitting the filter into the funnel is of some importance. Felt filters are supplied shaped for this particular purpose, whilst paper filters are found in commerce in circular or rectangular sheets. The folded filter paper should be as nearly circular as possible, and all angles should be cut off, as they are useless and also absorb and waste some of the liquid, which is often of considerable value, and so cause a heavy loss due to evaporation.

Filter papers may be used either in the flat or in the pleated condition. The flat paper is merely a folded piece, with any angles it may have cut off, and fitted to the funnel, so that it is in a single fold on one side of the funnel and in a triple fold on the other. This has the disadvantage of preventing the easy flow of the liquid between the outside surface of the paper and the smooth wall of the funnel. This can be remedied to some extent by placing a glass rod between the paper and the funnel wall. By folding the filter several times so that folded ridges hold the rest of the paper away from the funnel wall, this disadvantage is obviated to a considerable extent.

Filtration is a very simple operation. But it should be remembered that it is best at first only to pour on to the filter sufficient liquid to moisten the whole of the paper, and then fill up the paper without causing it to split, which may happen if the liquid is poured on too rapidly.

The filtration of very resinous infusions sometimes presents difficulties. This is especially the case with infusion of benzoin, which is often prepared in different concentrations: for example, for toilet soaps, infusions containing much resin are used, which are not used for the preparation of extracts. In the filtration of this type of infusion, a metallic cloth with sixty-four meshes per square centimetre is used, followed by a fine tissue through which the liquid passes in the clear condition. If it is still cloudy, it is placed in a warm place and allowed to stand for several days and the clear liquid carefully poured off.

Utilisation of Old Filter Papers and Filtration Residues.—As in other industries, there are waste substances in perfumery

which ought to be profitably employed. Used filter papers are amongst these. But generally, in busy times, these are thrown into a receptacle with other waste and finally burned in the furnace. Profit, however, can be made from them, by storing them in a closed vessel containing 95 per cent. alcohol, which dissolves the perfumes and oils contained in them. When the papers contain filtering powder, this is scraped off with a knife and preserved for use in the manufacture of sachets. The papers are then thrown into the alcohol with the others.

The alcohol is stirred from time to time so as to ensure complete extraction of the perfume. At the end of a certain time, the alcohol is poured off, and can be used for the preparation of cheap toilet waters. The papers are pressed and the remainder of the perfumed alcohol is extracted and the pressed papers are either burned or, better, air-dried and then reduced to powder, which is still sufficiently perfumed to be used for sachets.

Filters which have been used for musk deserve special attention. When filtration is finished, they are cut into small fragments and put into fresh alcohol for a new, second-quality infusion.

CHAPTER IV

COMPOUND EXTRACTS KNOWN AS BOUQUETS. PERFUMES FOR THE HANDKERCHIEF. PERFUMED WATERS

If the preparation of simple extracts, that is, infusions of a single essence, or of a single aromatic plant, in alcohol, does not present any serious difficulties, and if the judicious employment of raw materials of the best quality, and well-rectified alcohol, is sufficient for this manufacture, it is by no means the same in the case of creating "bouquets," that is, combinations of various extracts and essences and other aromatic materials, either to reproduce a natural odour or to produce a novel perfume, which may be termed a perfume "*de fantaisie*," such as may be demanded by fashion, or the taste of the consumer.

For the perfumer to hope to attain success in this branch of the industry, his sense of smell should be exceedingly well developed, because in a given perfume there may be eight or ten different extracts, and he should be able to detect the ingredients which give it its character, as well as those which are objectionable. But the quality of the bouquet cannot be judged mainly from the *nature* of the several ingredients, but the exact proportions which have been successfully employed must be taken into account. Every one to-day knows what the raw materials of eau de Cologne are. But how many manufacturers can claim to have exactly hit upon the proper proportions of the various ingredients, and how many can claim to have put upon the market a product to equal the original eau de Cologne of Jean Marie Farina? Toilet water—Lubin has much exercised the ingenuity of imitators, and although the aromatic ingredients entering into its composition are fairly well known, there are few products on the market which can enter into competition with this preparation so much appreciated by certain consumers.

It is obvious that it would be very difficult to lay down rules for the preparation of these compound extracts. It is only by long experience that the manufacturer succeeds in

producing articles of such irreproachable quality as to make his reputation.

Compound extracts should be kept for a certain time to allow the odours of the alcohol and the simple extracts employed to disappear, and the whole combination to blend harmoniously.

The finished extract should be kept in completely filled receptacles, well closed and kept in a cool and dark place. Under these conditions, it improves and gains in quality and sweetness. The vessels should be perfectly dry before the perfume is poured into them. The least trace of moisture may upset the equilibrium of the product, precipitate part of the perfume essence, and so modify the odour.

After the preparation of these compound extracts, however clear and transparent they may appear, they should be allowed to stand for several weeks, and then filtered before delivery to the consumer. The deposits which inevitably form in bottles from one cause or another can thus be avoided.

FIXATIVES

It may now be of interest to say a few words on Fixatives.

Fixatives, as the name implies, are bodies which serve to render more permanent odours of a fugitive nature, such as those of most flowers. They are either bodies of a very persistent odour, or are resins or slightly volatile liquids which hold the more volatile essential oils, either as a kind of varnish, or a viscous solution of low vapour tension, and consequently but slightly volatile, and—so long as the fixative is not highly odorous—which either scarcely modify the odour, or slightly improve it. There are various types of fixatives: some are of very agreeable odour; others are of very disagreeable odour; and others are practically odourless. It is necessary to combine them judiciously in order to obtain the best results. It is usually a case of skill and trade knowledge. Amongst the classic fixatives are ambergris, civet and musk. Ambergris can be well replaced by artificial ambergris; as for civet the difficulties attending its use and its persistent animal odour have caused its use to become somewhat restricted.

Pod musk is often adulterated with animal *débris*; grain musk, which is very expensive, is frequently partly exhausted and deprived of some of its odour value. In general, ordinary natural

musk gives a low odour yield, and its infusions require careful watching to produce results which shall not give a disagreeable odour.

Tonquin musk freed from fat * is more soluble than the ordinary musk, and gives results comparable to those of ordinary infusions, but it has no animal odour of a pronounced nature, and whilst fixing ordinary extracts, gives them a soft odour, which is much appreciated. It is not "violent," like synthetic musk, and has the advantage of being easily soluble in dilute alcohol, whilst pure alcohol cannot dissolve more than 3 grams of artificial musk per litre.

Ten grams of defatted Tonquin musk † represents 2 grams of grain musk, or more than 5 grams of pod musk.

Chrysol is a proprietary fixative. It has an agreeable odour of herbs, and is recommended for carnation, fern, and new-mown hay perfumes.

Formidol is also a proprietary fixative, but it is not very soluble in alcohol.

Benzyl salicylate is a useful fixative. It is used in the proportion of 1 per 1000 of the finished product.

The following list indicates the particular fixatives useful for the perfumes quoted.

Acacia.—Myrrh, frankincense, sumbul, champaca, musk-ambrette, vanilla, balsam of Tolu, balsam of Peru.

Amber.—Labdanum, ambrette oil, storax, vanilla, musk, and artificial ambergris.

Aubepine.—Storax, costus, benzoin, bois-de-Rose, vetiver in traces.

Broom.—Myrrh, frankincense, sumbul, musk-ambrette, vetiver, balsam of Peru.

Carnation.—Benzyl isoeugenol, musk-ambrette, labdanum.

Champaca.—Ambrette oil, sumbul, frankincense, benzyl isoeugenol, vanilla, tolu.

Chrysanthemum.—Mousse de chêne, benzyl isoeugenol, eananga, musk, thuja.

Corylopsis.—Rosindol, † rosewood, vanilla, ambrette oil, civet, opopanax, floranal, † storax, floradora, † orris resin.

Eglantine.—Rosindol, † rosewood, storax, benzoin, civet.

Fern.—Mousse de chêne, chrysanthema, † Tonquin bean, vanilla, benzyl isoeugenol, passiflora, †

* This appears to be the name given to a proprietary article.

† Proprietary articles.

Heather.—Elemi, Benzoin, frankincense, champaca, vanilla, formidol, floralal.

Heliotrope.—Balsam of Peru, tolu, benzoin, champaca, formidol,* costus.

Honeysuckle.—Myrrh, saubul, frankincense, vanillin, lignalol, mastic, formidol,* idyllin,* tolu, balsam of Peru.

Hyacinth.—Benzoin, ambrette, labdanum, linalol, rosewood, sylvanol.*

Jasmine.—Floralal,* costus, balsam of Peru, tolu, indol.

Jouquil.—Benzoin, ambrette, lignaloe, vanilla.

Lavender.—Lavender resins, benzoin, mastic, storax, musk, sylvanol.*

Lilac.—Floralal,* tolu, balsam of Peru, saubul, ambergris, grisambrene.*

Lily.—Formidol,* musk-ambrette, labdanum, storax, balsam of Peru, vanilla.

Lime-flowers.—Ambrette, tolu, balsam of Peru, benzoin, mastic, musk-ketone.

Lotus.—Benzoin, tolu, ambergris, vetivert, patchouli.

Magnolia.—Balsam of Peru, storax, musk, civet, benzylideneacetone, mastic.

Mimosa.—Balsam of Peru, tolu, mastic, ambrette, styrolenic alcohol, formidol.*

Muguet.—Floralal,* benzoin, ambrette, orris-resin, linalol, rosewood.

New-mown Hay.—Mousse de chêne, Tonquin bean, coumarin, thuja, benzyl isoeugenol.

Orange-flower.—Musk, frankincense, mastic, benzoin, tolu, balsam of Peru.

Orchid.—Mousse de chêne, balsam of Peru, benzoin, musk-ambrette.

Orris.—Orris resin, costus.

Patchouli.—Musk, civet, elemi, thuja.

Portugal.—Balsam of Peru, tolu, benzoin, civet.

Reseda.—Orris resin, costus, ambrette, labdanum, storax.

Rose.—Rosindol,* rosewood, vetivert, patchouli, storax, sandalwood.

Sweet Pea.—Benzylideneacetone, cglantine,* tolu, balsam of Peru, mastic.

Trèfle.—Mousse de chêne, champaca, cananga, formidol,* musk-ambrette, benzoyl isoeugenol.

* Proprietary articles.

Tuberose.—Floranal,* costus, balsam of Peru.

Verbena.—Labdanum, elemi, benzoin, storax.

Violet.—Floradora,* floranal,* ambrette, orris-resin. For soap, *passiflora*,* formidol,* violet resins, yara-yara, etc.

Wallflower.—Balsam of Peru, storax, tolu, benzoin, floranal,* lignaloe.

Ylang-ylang.—Ambrette, frankincense, myrrh, tolu, balsam of Peru.

It is obvious that the above merely give an indication of the substances which are useful, which may be varied according to circumstances.

FORMULÆ FOR THE PREPARATION OF PERFUMES FOR THE HANDKERCHIEF

The formulæ here given are those which prolonged experience has convinced the author are those which may be relied upon to give satisfactory results.

They are divided into two series. In the first, are reproduced the older, well-established formulæ without any modification, because they are old, classic formulæ which command respect, and can be modified by combination with synthetics. In the second, the newer formulæ containing synthetics are included.

FORMULÆ FOR TRIPLE EXTRACTS (BEST QUALITY)

SERIES I

The extracts or infusions used are all brought to 92 per cent. alcoholic strength by the addition of aromatic water.

Extract of Jasmine

Infusion of jasmine, I †	7 litres
„ jasmine, II ¶	1 l. 500 c.c.
„ tuberose, I	1 litre
„ orange, I	500 c.c.
„ civet, I	60 grams
„ musk, I	35 „
„ wintergreen	8 „

Reduce to 92 per cent. alcoholic strength according to the general instructions mentioned previously.

* Proprietary articles.

† As has been said previously, infusion number one may be replaced by 15–20 grams of absolute essence, liquid or concrete, per litre of 95 per cent. alcohol.

¶ Infusion number two may be replaced by 6–8 grams of absolute essence, liquid or concrete, per litre of 95 per cent. alcohol.

Extract of Rose

Infusion of rose, I.....	6 litres
„ rose, II	3 „
„ civet, I	30 grams
„ musk, I	30 „
Essence of rose, II	15 „
Oil of geranium	15 „

Reduce to 92 per cent.

Extract of Violet

Infusion of violet, I	4 litres
„ violet, II	1 litre
„ jasmine, I	750 grams
„ orris, I	2 litres
„ cassia, I	2 „
„ musk, I	30 grams

Reduce to 92 per cent.

Extract of Patchouli

Infusion of rose, I.....	1 l. 500 c.c.
„ rose, II	4 litres
„ orange, II	4 „
Essence of patchouli, II	150 grams

Reduce to 92 per cent. with orange-flower water.

Extract of Mignonette

Infusion of mignonette, I	3 litres
„ mignonette, II	2 „
„ violet, I	2 „
„ violet, II	1 litre
„ cassia, I	1 „
„ rose, I.....	500 grams
„ tuberose, I	500 „
Santal oil	1 gram
Infusion of musk, I	15 grams
„ civet, I	15 „

Reduce to 92 per cent. with rose-water.

Extract of Verbena

Infusion of orange, I	3 litres
„ cassia, I	2 „
„ rose, II	6 „
„ civet, I	60 grams
Oil of verbena	200 „
Oil of bergamot.....	10 „
„ lemon	30 „
„ citronella	10 „

Reduce to 92 per cent. with rose-water.

Perfume very delicate, but rather powerful.

" Ambre-Royal "

Infusion of ambrette, I	2 litres
" orris, I	2 "
Alcohol 90 per cent.	1 litre
Infusion of mousse de chêne, I	500 grams
" musk, I	10 "
" civet, I	15 "
" vanilla, I	100 "
" ambergris, I	250 "

Reduce to 92 per cent. with rose-water.

Extract of New-mown Hay

Infusion of rose, I.....	2 litres
" cassie, I	2 "
" orange, I	1 litre
" Tonquin bean, I	2 litr. 8
" cassie, II	3 "
Sweet orange oil	60 grams
Verbena oil	10 "
Lemon oil	40 "
Lavender oil	100 "
Algerian petitgrain oil ..	10 "
Oil of rosemary	10 "
Oil of wintergreen.....	10 "

Reduce to 92 per cent. with rose-water.

Bouquet Victoria

Infusion of rose, I.....	1 litre
" tuberose, I	1 "
" jonquil, I	1 "
" orris, I	1 "
" guaiac wood, I	500 grams
" pyrethrum, I	500 "
" nutmeg, I	250 "
" musk-pod	500 "
" cananga, I	250 "
" Tonquin bean, I	500 "
" ambrette, I	1 litre
" rose, I	500 grams
Oil of neroli	10 "
Bergamot oil	20 "
Infusion of civet, I	20 "

Reduce to 92 per cent. with rose-water.

Extract of Musk

Infusion of ambrette, I	2 litres
" musk, II	6 "
" rose, II	500 grams
" jasminto, II	1 litre
" musk, I	400 grams
" ambergris, I	100 "
" civet	1 l. 500 c.c.

Reduce to 92 per cent.

• *Extract of Vanilla*

Infusion of vanilla, I	3 litres
„ vanilla, II	3 „
„ rose, II	2 „
„ tuberose, II	1 „
„ Tonquin, I	500 grams
„ clove, I	100 „
„ ambergris, I	50 „

Reduce to 92 per cent. with rose-water.

This perfume has lost much of its old importance.

Extrait de Mousseline

Infusion of orange, I	1 l. 500 c.c.
„ tuberose, I	1 litre
„ cassie, I	1 „
„ rose, I	1 „
„ jonquil, I ..	1 „
„ jonquil, II	2 litres
„ balsam of Peru	500 grams
„ ambergris, I	30 „
„ civet, I	30 „
„ musk, I	30 „

Reduce to 92 per cent. with rose-water.

A very old perfume, always popular.

Extract of Heliotrope

Infusion of orange, I	1 litre
„ orange, II	2 litres
„ vanilla, I	2 „
„ vanilla, II	1 l. 500 c.c.
„ jonquil, I	1 litre
„ Tonquin bean, I	500 grams
„ rose, II	1 litre
„ tuberose, II	1 „
„ musk, I	60 grams
„ ambergris, I	60 „
Oil of bitter almond	15 „

Reduce to 92 per cent. with orange-flower water.

Jockey Club (Triple Extract)

Infusion of orange, I	1 litre
„ jasmine, I	2 litres
„ jonquil, I	1 litre
„ Tonquin bean, I	500 grams
„ jasmine, II	2 litres
„ bois de Rose ..	250 grams
„ cassie	500 „
„ civet, I	30 „
„ musk, I	30 „
„ ambergris, I	30 „
Oil of bergamot	30 „
Santal oil	5 „

Reduce to 92 per cent. with orange-flower water.

Extract of Sweet Pea

Infusion of orange, I	3 litres
„ tuberose, I	3 „
„ tuberose, II	1 litre
„ jonquil, I	2 litres
„ jasmine, II	500 grams
„ storax, I	300 „
„ civet, I	30 „
„ musk, I	15 „
Oil of neroli	5 „

Reduce to 92 per cent. with orange-flower water.

A perfume always popular, especially in England.

Bouquet de France (Extract)

Infusion of rose, I	1 litre
„ jasmine, I	1 „
„ orange, I	1 „
„ orange, II	2 litres
„ cassie, I	1 litre
„ orris, I	1 „
„ ambrette, I	2 litres
„ vanilla, I	750 grams
„ jasmine, II	500 „
„ ambergris, I	50 „
„ musk, I	150 „
Oil of bergamot	250 „
„ lavender	10 „

Reduce to 92 per cent. with rose-water.

Extract of Magnolia

Infusion of rose, I	2 litres
„ orange, I	4 „
„ jasmine, I	2 „
„ tuberose, I	750 grams
„ mousse de chêne, I	1 litre
„ musk, I	30 grams
„ civet, I	30 „
Oil of verbena	5 „
„ lemon	25 „
Essence of rose, II	2 „
„ wintergreen	2 „

Reduce to 92 per cent. with rose-water.

Extrait de Volkameria

Infusion of violet, I	1 litre
„ tuberose, I	1 „
„ mousse de chêne, I	2 litres
„ orange, I	1 litre
„ Tonquin bean, I	1 „
„ nutmeg, I	500 c.c.
„ orris, I	1 litre
„ jonquil, I	1 „
„ musk-pod	500 grams

FORMULÆ FOR DOUBLE EXTRACTS

131

Infusion of musk, I	60 grams
„ civet, I	30 „
„ storax, I	100 „
Oil of lemon	20 „
„ Algerian petitgrain ..	10 „
„ verberna	10 „

Reduce to 92 per cent. with rose-water.

FORMULÆ FOR DOUBLE EXTRACTS (BEST QUALITY)

SERIES 1

In the following extracts the alcohol is brought to 80 per cent. by the addition of aromatic or pure water, according to the nature of the extract.

• *Extract of Jasmine*

Infusion of jasmine, I	5 litres
„ tuberose, II ..	3 „
„ jasmine, II	2 „
„ musk, I	20 grams
„ civet, I	40 „
Oil of wintergreen.....	2 „

Reduce to 80 per cent. with rose-water.

Violet Extract

Infusion of violet, I	2 litres
„ violet, II	2 „
„ jasmine, II	1 litre
„ orris, II	2 litres
„ cassia, I	1 litre
„ cassia, II	1 „
„ musk-pod, I	25 grams

• Reduce to 30 per cent. with orris-water.

Rose Extract

Infusion of rose, I.....	3 litres
„ rose, II	2 l. 500 c.c.
„ jasmine, I	4 litres
„ civet, I	25 grams
„ musk, I	15 „
Oil of rose	5 „
„ geranium	8 „

Reduce to 80 per cent. with rose-water.

Ambrosie (Extract No. 2)

Infusion of ambrette, I	1 l. 500 c.c.
" musk-pod, I	1 litre
" mousse de chêne, I	1 "
Alcohol	1 "
Infusion of ambergris, I	100 grams
" " II	100 "
" civet, I	25 "
" vanilla, I	50 "

Reduce to 80 per cent. with rose-water.

Bouquet (Extract No. 2)

Infusion of rose, I	1 litre
" orange, II	1 "
" jasmine, II	2 l. 500 c.c.
" cassie, I	500 c.c.
" orris, I	1 litre
" ambrette, I	2 litres
" vanilla, I	1½ grams
" ambergris, I	50 "
" musk I	60 "
" bergamot	150 "
Oil of lavender	10 "

Reduce to 80 per cent. with rose-water.

Extract of Sweet Pea

Infusion of orange, I	2 litres
" tuberosc, I	2 "
" jonquil, II	4 "
" tuberosc, II	1 litre
" jasmine, II	500 grams
" storax	250 "
" civet, I	30 "
" musk-pod, I	15 "
Oil of neroli	5 "

Reduce to 80 per cent. with orange-flower water.

Extract of Mignonette

Infusion of mignonette, I	2 litres
" violet, I	1 litre
" cassie, I	1 l. 500 c.c.
" tuberosc, II	500 grams
" rose, II	1 litre
" mignonette, II	2 litres
" violet, II	2 "
" civet, I	15 grams
" musk-pod, I	15 "
Oil of santal	5 "

Reduce to 80 per cent. with rose-water.

Extract of Santal

Infusion of mousse de chêne, I	500 grams
„ musk-pod, I	500 „
„ santal, IV	1 l. 500 c.c.
„ ambergris, I	50 grams
Oil of sandalwood	30 „

Reduce to 80 per cent. with rose-water.

Extract of Verbena

Infusion of orange, I	2 litres
„ cassie, II	2 „
„ cassie, I	1 litre
„ rose, II	5 litres
„ civet, I	60 grams
Oil of verbena	160 „
„ bergamot	10 „
„ lemon	30 „
„ citronella	5 „

Reduce to 80 per cent. with rose-water.

Extract of Patchouli

Infusion of rose, II	3 litres
„ orange, II	3 „
Alcohol	4 „
Essence of patchouli, II	120 grams
Oil of geranium	20 „

Reduce to 80 per cent. with rose-water.

Mousseline (Extract)

Infusion of orange, I	1 litre
„ jonquil, I	500 c.c.
„ jonquil, II	1 litre
„ rose, I	1 „
„ cassie, I	500 c.c.
„ gum benzoin, I	1 litre
„ orange, II	1 „
„ cassie, II	1 „
„ balsam of Peru, I	250 grams
„ civet, I	30 „
„ musk-pod, I	30 „
„ ambergris, II	30 „

Reduce to 80 per cent. with rose-water.

Jockey Club (Extract)

Infusion of orange, I	500 c.c.
„ jasmine, I	1 „
„ jonquil, I	1 „
„ Tonquin bean, I	500 „
„ jasmine, II	4 litres
„ rosewood, I	2 „
„ gum benzoin, II	1 litre

Infusion of civet, I	30 grams
„ musk-pod, I	30 „
„ ambrette, I	30 „
Oil of bergamot	30 „
„ sandalwood	5 „

Reduce to 80 per cent. with rose-water.

Extract of Heliotrope

Infusion of vanilla, I	1 litre
„ jonquil, I	1 „
„ Tonquin bean, I	500 c.c.
„ orange, II	3 litres
„ rose, II	1 litre
„ tuberose, II	1 „
„ vanilla, II	2 litres
„ musk-pod, I	50 grams
„ ambrette, I	50 „
Essence of bitter almonds, I	12 „

Reduce to 80 per cent. with orange-flower water.

Extract of Volkameria

Infusion of violet, II	1 litre
„ cassia, II	1 „
„ orange, I	1 „
„ Tonquin bean, I	1 „
„ nutmeg, I	500 c.c.
„ orris, I	1 litre
„ orange, II	1 „
„ musk-pod, II	500 c.c.
„ jonquil, II	1 litre
„ musk-pod, I	100 grams
„ civet, I	30 „
Oil of lemon	20 „
„ petitgrain	10 „
„ verbena	10 „
Infusion of storax	80 „

Reduce to 80 per cent. with rose-water.

Bouquet de Chantilly (Extract)

Infusion of rose, II	1 litre
„ tuberose, II	1 „
„ jonquil, I	1 „
„ orris, I	1 „
„ guaiac wood, I	500 grams
„ pyrethrum, I	250 „
„ camanga, I	250 „
„ musk-pod, I	500 „
„ ambergris, II	1 litre
„ Tonquin bean, I	500 grams
„ ambrette, I	1 litre
„ rose, II	500 grams
„ jasmine, II	1 litre
„ civet, I	20 grams
Oil of neroli	10 „
„ bergamot	20 „

Reduce to 80 per cent. with orange-flower water.

MANUFACTURE OF EXTRACTS

131

Flowers of Spring (Extract)

Infusion of rose, I	2 litres
„ orange, I	2 „
„ jasmine, II	2 „
„ orange, II	2 „
„ tuberose, II	1 litre
„ mousse de chêne, I	500 grams
„ musk-pod, I	30 „
„ civet, I	30 „
„ verbena	5 „
„ lemon	25 „
„ rose geranium	28 „
„ wintergreen	„

Reduce to 80 per cent. with rose-water.

MANUFACTURE OF EXTRACTS NO. 3 (ORDINARY QUALITY)

SERIES I

The percentage of alcohol is brought to 70 per cent. with aromatic or ordinary distilled water.

Extract of Jasmine

Infusion of tuberose, II	750 grams
„ jasmine, I	3 litres
„ musk-pod, I	30 grams
„ civet, I	30 „
Oil of wintergreen	2 „

Reduce to 70 per cent. with distilled water.

Rose Extract

Extract of rose, II	3 litres
Infusion of rose, II	3 „
„ rose, I	500 grams
„ musk, I	30 „
„ civet, I	30 „
Oil of geranium	26 „

Reduce to 70 per cent. with rose- or distilled water.

Violet Extract

Extract of violet, II	2 litres
„ violet, I	2 „
Infusion of violet, II	7 „
„ cassia, I	2 „
„ orris, I	1 litre
„ musk, I	25 grams
„ civet, I	50 „
Oil of bergamot	25 „

Reduce to 70 per cent. with orris-water.

Verbena (Extract)

Extract of verberia, I	5 litres
„ verberia, II	1 litre
Alcohol	1 „
Oil of verberia	20 grains

Reduce to 70 per cent. with distilled water.

Extract of Heliotrope

Extract of heliotrope, I	3 litres
Infusion of orange, II	1 litre
„ tuberose, II	1 „
„ rose	500 grams
Alcohol	500 c.c.

Reduce to 70 per cent. with rose-water.

Extract of Patchouli

Extract of patchouli, I	2 litres
Alcohol	2 „
Extract of patchouli, II	25 grams

Reduce to 70 per cent. with distilled water.

Extract of Hawthorn

Infusion of jasmine, II	1 litre
„ jasmine, I	250 grams
„ tuberose, II	1 litre
„ tuberose, I	250 grams
„ orange, I	1 litre
„ cassie, I	250 grams
„ jonquil, I	500 „
Alcohol	250 „
Infusion of civet, I	15 „
„ musk, II	15 „
„ ambergris, II	15 „
Essence of bitter almonds, I	10 „

Reduce to 70 per cent. with distilled water.

Mousseline (Extract)

Extract of ambergris, II	4 litres
„ mousseline, II	500 grams
Infusion of tuberose, II	250 „
„ cassie, II	250 „
„ orange, II	250 „
„ jonquil, II	250 „

Reduce to 70 per cent. with distilled water.

Extract of Magnolia

Extract of magnolia, II	3 litres
Infusion of tuberose, II	500 grams
„ jasmine, II	500 „
„ cassie, II	500 „
„ rose, II	500 „
„ orange, II	500 „
„ violet, II	500 „
Alcohol	500 c.c.

Reduce to 70 per cent. with rose-water.

Jockey Club (Extract)

Extract of Jockey Club, II	5 litres
Infusion of tuberose, II	2 „
„ jasmine, II	1 litre
„ rose, II	500 grams
„ cassie, II	500 „
„ orange, II	500 „
„ jonquil, II	500 „
„ Tonquin bean, I	250 „

Reduce to 70 per cent. with distilled water.

FORMULE FOR MANUFACTURE OF EXTRACTS NO.
(QUALITY, CHEAP PERFUMERY)

SERIES I

Alcohol strength = 60 per cent.

Extract of Jasmine

Infusion of tuberose, II	5 l. 250 c.c.
„ cassie, II	250 grams
„ jasmine, II	4 litres
Alcohol	2 „
Infusion of musk-pod, II	30 grams*
„ civet, II	30 „
Oil of wintergreen	2 „

Reduce to 60 per cent. with distilled water.

Extract of Rose

Alcohol	6 litres
Infusion of rose, I	1 litre
„ rose, II	1 „
„ musk-pod, II	30 grams
„ civet, II	30 „
Oil of geranium	20 „

Reduce to 60 per cent. with distilled water.

Extract of Violet

Infusion of cassie, II	5 litres
„ rose, II	500 grams
„ tuberosc, II	500 „
„ orris, I	2 litres
„ orange, I	500 grams
„ jasmine, II	1 litre
Alcohol	8 l. 500 c.c.
Infusion of musk-pod, II	25 grams
„ civet, II	50 „
Oil of bergamot	20 „

Reduce to 60 per cent. with distilled water.

Bouquet (Extract)

Alcohol	7 l. 500 c.c.
Infusion of orange, II	750 grams
„ Tonquin bean, I	1 litre
„ cassie, II	250 grams
„ vanilla, II	125 „
„ tuberosc, II	250 „
„ balsam of Pern, I	250 „
„ storax, I	250 „
Oil of bergamot	32 „
„ geranium	4 „
„ neroli	2 „
„ cloves	8 „
Essence of bitter almonds, III	3 „
Oil of anise-d	8 „
„ wintergreen	4 „

Reduce to 60 per cent. with distilled water.

Clower (Extract)

Infusion of orange, II	1 l. 660 c.c.
„ tuberosc, II	1 l. 660 „
„ orris, II	1 l. 660 „
„ Tonquin bean, I	830 grams
Essence of bitter almonds, II	4 „
Oil of neroli	2 „

Reduce to 60 per cent. with distilled water.

Extract of Musk

Alcohol	1 litre
Infusion of musk-pod, I	1 „
„ civet, II	100 grams
„ castoreum, I	100 „

Reduce to 60 per cent. with distilled water.

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FORMULÆ FOR PERFUMES MANUFACTURED BY
USING SYNTHETIC PERFUMES

SECOND SERIES

TRIPLE AND QUADRUPLE EXTRACTS

As has already been stated in the course of this volume, the majority of synthetic perfumes are of an exceedingly strong degree of concentration. Their strength, however, prevents their use except as a reinforcing agent to the natural perfumes, and in order to create new perfumes. For this reason, it would be futile to employ them exclusively, that is to say, apart from natural perfumes. A series of formulæ for the use of them is appended, though these formulæ are in no way exhaustive, and can be modified at will according to the taste of the maker. Furthermore, it is sufficient to use the formulæ for natural perfumes previously given, and to modify them by a judicious mixing of the appropriate synthetic perfumes to obtain the desired result, and thus a series of products bearing the stamp of novelty may be manufactured.

To obtain the best results and to reproduce the perfume with its full bouquet, fairly large quantities must be used and the extracts left to mature for five or six weeks before storing in containers. It is also very important that the manufactured extracts are not filtered immediately after mixing, but only after eight or ten days, for during this period any turbidity developed may disappear of its own accord, and the sediment sinks to the bottom, settles, and thus the filtration is facilitated. There are also other reasons against immediate filtration; very many extracts have exceedingly volatile and very costly essences added to them, and these, not having sufficient time to combine with the mixture, would remain in the filter or undergo great loss through evaporation.

Lastly, the solutions, extracts, and tinctures ought to mature in order that the perfumes may acquire the body and delicacy which only the action of time can produce.

Acacia

Acacia has a strong, sweet odour. This perfume is produced with synthetic acacia, mixed with synthetic hawthorn, jasmine, rose, musk, and vanillin. Crystallised yara-yara also

TRIPLE AND QUADRUPLE EXTRACTS 141

coumarin, orgeol (proprietary, rose odour), and oils of petit-grain and linaloc. The fixatives employed are civet and storax. In maturing, care must be taken to prevent the perfume settling, for this is apt to cause stains on handkerchiefs. (These can be removed by the use of a trace of oxalic acid.)

Infusion of "mousse de chêne"	6 l. 125 c.c.
„ orange, 1	1 l. 225 „
„ jasmine, 1	3 l. 650 „
Coumarin	20 grams
Infusion of storax	200 „
Orgeol (proprietary rose odour)	15 „
Oil of petitgrain	10 „
„ linaloc	20 „

Clematis

Alcohol, 95 per cent.	2 l. 500 c.c.
Oil of bergamot	30 grams
Tincture of artificial civet	10 „
„ „ musk	30 „
Essence of synthetic jasmine	20 „
Liquid hawthorn	5 „
Artificial essence of rose	10 „
„ clematis	80 „
Infusion of benzoin	40 „

Camellia

Infusion of jasmine	1 l. 950 c.c.
„ orange	600 c.c.
Tincture of artificial orris	100 grams
„ „ civet	20 „
Artificial essence of ylang-ylang	5 „
Linalol,	5 „
Bromelia	5 „
Dianthine (proprietary, carnation odour)	2 „

Cassia

Tincture of artificial cassia	2 l. 450 c.c.
„ „ jasmine	2 l. 450 „
„ „ vanillin	200 grams
„ „ musk	100 „
„ „ civet	50 „
Artificial neroli	5 „

Clover

Infusion of rose, 1	1 litre
„ „ jonquil, 1	1 „
„ „ violet, 1	1 „
„ „ nasturtium, 1	1 „
Crystallised vanillin	10 grams
Synthetic mintosa	5 „
Oil of neroli	8 „
Terpinol	2 „
Iron	4 „
Infusion of tolu	50 „
„ „ musk	50 „
Oil of bitter almonds	2 „

Cherry Blossom

Infusion of orris, 1	2 l. 500 c.c.
„ rose, 1	2 litres
„ jonquil, 1	500 c.c.
Artificial neroli	25 grams
Vanillin	10 „
Infusion of musk	50 „
„ benzoin	150 „
Oil of bergamot	50 „
„ bitter almonds	5 „
„ fennel	5 „
Acetic ether	20 „
Artificial hawthorn	3 „
Coumarin	1 „

Cattleya. Triple Extract

To reproduce the perfume of this member of the orchid group, numerous varieties of which exist, special compositions must be used. The flower itself gives off a strong perfume, a little heavy, but sweet. As a base, infusion of jasmine is taken, and those of orange and tuberose are added, also essence of ylang-ylang, violet, a little hyacinth, and natural rose. Equally good results are obtained by adding a trace of oil of neroli and coumarin, and about 0.5 gram of oil of bitter almonds (for 5 kg. of perfume). The fixatives used are musk and civet, or Siamese benzoin. Sometimes oil of patchouli is used as a fixative :—

Alcohol, 95 per cent.	1 l. 125 c.c.
Oil of manilla ylang-ylang	5 grams
Artificial hyacinth	1 gram
Vanillin	0.5 gram
Coumarin	0.25 „
Concentrated essence of rose	0.5 „
Synthetic neroli	1 „
Ionone	0.5 „
Oil of bitter almonds	0.5 „
Synthetic jasmine	0.5 „
Tincture of artificial civet	5 grams
Infusion of musk, 1	5 „
„ ambergris	5 „

Chrysanthemum

Triple extract of lilac	2 l. 250 c.c.
„ „ musk	2 l. 500 „
„ „ heliotrope	1 l. 125 „
„ „ ylang-ylang	1 l. 125 „
Cheranthia (proprietary perfume, wallflower odour)	10 grams

From this formula a bouquet is obtained the perfume of which is strikingly akin to that of the scented chrysanthemum.

Gardenia

Infusion of rose, I	1 litre
" violet, I	500 c.c.
" tuberose, I	500 "
Tincture of vanillin	125 grams
Eglantine (proprietary, wild rose odour)	10 "
Anisic aldehyde	3 "
Terpineol	15 "
Artificial neroli	2 "
Infusion of musk	15 "

Broom

The perfume of broom has quickly taken the public fancy as being a select yet refreshing perfume. As a base, infusion of broom is taken, prepared from "absolute" solid essence of broom or from the semi-liquid essence. A trace of otto of rose is added, also neroli, and a very little vanillin. The fixatives employed are infusions of storax and ambergris. The addition of an infusion of "mousse de chêne" and a small quantity of essence of jasmine allows of an agreeable toning of the perfume; traces of clover perfume give an excellent result. The following formula is given as a working example :—

Infusion of broom	5 litres
Tincture of ambergris	1 l. 250 c.c.
" vanillin	30 grams
Oil of neroli	15 "
Otto of rose	45 "

Jonquil

The perfume of jonquil is closely analogous to that of hyacinth, but is more subtle.

Infusion of jonquil, I	2 l. 450 c.c.
" jasmine, I	600 c.c.
" tuberose, I	600 "
" musk	20 grams
Synthetic neroli	5 "
Hyacinth	5 "
Chrysol (proprietary perfume)	1 "

Jasmine

Tincture of synthetic jasmine	9 l. 800 c.c.
Infusion of musk	20 grams
" storax	80 "
Synthetic rose	1 gram
Methyl anthranilate	1 "
Indol	0.5 "

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Oriental Jasmine

A perfume of exquisite delicacy, lying between that of jasmine and jonquil, with a suggestion of tuberose. It is made from Oriental jasmine, which is gathered freely in Syria. Messrs. Lautier fils make large quantities every year, which are quickly taken up by the perfumery trade. The perfume can be copied by taking as a base infusions of jasmine and jonquil, to which is added a trace of infusion of tuberose. To complete, add small quantities of essences of jasmine, rose, and bergamot. By the addition of a trace of infusion of cassie a special shade is obtained. As fixatives, musk and benzoin and a trace of oil of ylang-ylang are used. The following is a useful working formula :—

Infusion of jasmine	8 litres
Tincture of jonquil	7 "
" " jasmine	2 "
Concrete essence of cassie	2 grams
Oil of ylang-ylang	10 "
" rose (synthetic)	20 "

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White Lilac

This is obtained from terpineol, or from combinations of terpineol such as synthetic lilac, lily of the valley, syringa, etc.

Infusion of jasmine, I	6 l. 125 c.c.
" tuberose, I	1 l. 950 "
" cassie, I	300 c.c.
Terpineol	175 grams
Synthetic lily of the valley	100 "
Essence of ylang-ylang	15 "
Infusion of musk	75 "
" Siamese benzoin	150 "

White Lilac (another formula)

Alcohol, 95 per cent.	675 c.c.
Terpineol	5 grams
Essence of ylang-ylang	0.2 gram
Synthetic neroli	1 "
Concentrated essence of jasmine	2 grams
" " " rose	1 gram
Infusion of tuberose, I	250 grams
" jonquil, I	200 "
Ionone	0.5 gram
Oil of bitter almonds	0.2 "
" cloves	0.2 "
Infusion of musk, I	2.5 grams

White Lilac (Quadruple)

Alcohol, 95 per cent.	3 l. 550 c.c.
Terpineol	250 grams
Heliotropin	25 "
Essence of ylang-ylang	40 "
Infusion of jasmine, 1	1 l. 450 c.c.
" rose, 1	800 c.c.
" civet, 1	40 grams

Turkish Lilac

Alcohol, 95 per cent.	6 l. 500 c.c.
Concentrated essence of jasmine	70 grams
" " " cassie	10 "
Terpineol	100 "
Synthetic syringa	70 "
Narceol (proprietary, jasmine odour)	6 "
Tincture of artificial musk	90 "
Infusion of benzoin	100 "

Persian Lilac

Tincture of synthetic jasmine, 1	800 c.c.
" " " tuberose, 1	600 "
" " " rose, 1	600 "
Terpineol	20 grams
Essence of cananga	3 "
Infusion of musk, 1	15 "
Linalol	3 "
Vanillin	2 "
Lily of the valley (artificial oil)	5 "
Infusion of benzoin	15 "

Geranium (Triple)

Tincture of artificial rose	4 l. 900 c.c.
Oil of Algerian geranium	140 grams
" cloves	15 "
Infusion of musk	25 "
Oil of bergamot	8 "
Geraniol	10 "

Geranium (Quadruple)

Alcohol	1 l. 225 c.c.
Oil of Spanish geranium	150 grams
Infusion of rose, 1	2 l. 450 c.c.
Oil of bergamot	60 grams
" Manilla ylang-ylang	6 "
Infusion of musk, 1	100 "
" orris	2 l. 950 c.c.
Rose-water	200 grams
Geraniol	20 "

Broom

Infusion of jasmine, 1	2 l. 200 c.c.
„ orange, 1	600 c.c.
Liquid essence of orris	5 grams
Synthetic broom	25 „
Coumarin	3 „
Vanillin	5 „
Hawthorn (anise aldehyde)	3 „
Tincture of artificial civet	20 „
Infusion of benzoin	100 „

Carnation (Triple)

Carnation (artificial oil)	30 grams
Dianthine (proprietary, carnation odour)	5 „
Oil of rose	1 „
„ neroli	2 „
„ synthetic ylang-ylang	1 gram
Heliotropin (or heliotropin)	5 grams
Infusion of musk	50 „
„ benzoin	50 „
Tincture of synthetic jasmine, 1	3 l. 675 c.c.

Eglantine

Infusion of rose, 1	4 l. 900 c.c.
„ jasmine, 1	4 l. 900 „
Alcoholic solution of essence of rose	600 c.c.
Tincture of artificial musk	20 grams
„ „ civet	40 „
Infusion of tolu	30 „
Liquid hawthorn	10 „

White Heliotrope

Strictly speaking, heliotrope can be prepared by a simple solution of crystallised heliotropin, but this method produces a deep red colour when the solution is acted upon by light. The appended formula gives good results (triple extract).

Tincture of artificial tuberose, 1	2 l. 200 c.c.
„ „ rose, 1	2 l. 200 „
„ „ musk, 1	3 l. 675 „
Heliotropin	180 grams
Vanillin	50 „
Essence of rose	10 „
„ ylang-ylang	10 „
Infusion of benzoin	300 „

Blue Heliotrope

Tincture of artificial rose, 1	3 l. 425 c.c.
Heliotropin	100 grams
Bourbonal (proprietary, vanilla odour)	40 „
Tincture of artificial musk	3 l. 675 c.c.
Synthetic rose	25 grams
Essence of ylang-ylang	20 „

Heliotrope (Quadruple)

Heliotropin, extra	100 grams
Coumarin	15 "
Vanillin	1 gram
Infusion of jasmine, 1	1 l. 470 c.c.
" rose, 1	1 l. 470 "
" tuberose, 1	735 c.c.
" orange, 1	735 "
" civet	200 grams
" ambrette	100 "
" benzoin	50 "
Alcohol, 95 per cent.	1 l. 225 c.c.

Hyacinth

Artificial hyacinth reproduces the perfume of the flower quite perfectly; but this perfume is very strong, and it is sufficient to dissolve 4 to 5 grams in a litre of alcohol in order to obtain the equivalent of a No. 1 infusion. Consequently, it must be used with discretion, for it quickly overcomes one's sense of smell. The more it is diluted, the nearer it resembles the perfume of the flower. It is equally soluble in all fatty oils. The following formula will give an excellent product:—

Infusion of orange, 1	2 l. 450 c.c.
" tuberose	2 l. 450 "
" musk	20 grams
" ambergris	5 "
" benzoin	30 "
Hyacinth (artificial oil)	50 "
Lilac	10 "
Oil of rose (artificial)	2 "

White Hyacinth (Triple)

Hyacinth (artificial oil)	50 grams
Infusion of tuberose, 1	2 l. 450 c.c.
" orange, 1	2 l. 450 "
Agfa fixative (proprietary article)	40 grams
Infusion of musk, 1	20 "
" benzoin	30 "
Tincture of vanillin	100 "
Otto of rose	2 "

Red Hyacinth (Triple)

Alcohol, 95 per cent.	1 l. 25 c.c.
Hyacinth (artificial oil)	5 grams
Otto of rose	0.5 gram
Vanillin	0.1 "
Oil of lemon	1 "
" cloves	0.25 "
" ylang-ylang	1 "
" synthetic neroli	0.5 "
" Ceylon cinnamon	5 drops
" bitter almonds	5 "
Ionone	10 "
Infusion of musk, 1	10 "
" ambergris	20 "

Ixora (fancy perfume)

Tincture of synthetic cassie, I	1 l. 225 c.c.
" " nignonette, I	1 l. 225 "
Infusion of tuberose, I	980 c.c.
" violet, II	980 "
" benzoin	150 grams
" musk, I	100 "
" civet	20 "
Indol	20 "
Oil of bergamot	30 "
Hawthorn (anise aldehyde)	5 "

Cherry Blossom

Infusion of rose, III	2 l. 500 c.c.
" orris	2 l. 500 "
Synthetic neroli	20 grams
Vanillin	8 "
Coumarin	1.5 "
Oil of bitter almonds	2 to 5 grams
Anethole	0.5 gram
Acetic ether	12 grams
Oil of bergamot	40 "
Infusion of Siamese benzoin	100 "
" musk	40 "
Oil of fennel	4 "

The addition of the last two ingredients is a matter of taste, and their presence is not essential.

Magnolia

Tincture of artificial tuberose	4 litres
Infusion of jonquil, II	500 c.c.
" orange, II	500 "
Triple extract of geranium	1 litre
Essence of artificial rose	10 grams
Synthetic neroli	5 "
" jasmine	5 "
Methyl anthranilate	2 "

Mimosa

Infusion of jasmine, I	1 litre
" cassie, II	2 litres
" rose, I	2 "
Synthetic mimosa	30 grams
Infusion of musk	40 "
" benzoin	150 "
Oil of geranium	20 "
" bergamot	20 "
" orris	2 "

Clover

Amongst the different varieties of cultivated clover in France, *Trifolium incarnatum*, L., is the only one which yields a pleasant

perfume and resembles that of ylang-ylang. A field of "trèfle incarnat" is a poem in perfumery. To the moist freshness of the summer twilight, when the noises of the day have ceased, there rises, from the soil, from the corn, from the clover in flower, as it were a divine bouquet, which carries to the Creator the silent homage of all earthly blossoms. Messrs. Piver, of Paris, have produced a synthetic article which exemplifies very perfectly the rustic properties of this type of clover. Herewith are several formulæ for these extracts :—

Trèfle Incarnat

Infusion of tuberose, I	3 l. 100 c.c.
" jasmine, I	3 l. 100 "
" orange, I	1 l. 125 "
Essence of ylang-ylang	10 grams
Coumarin	5 "
Vanillin	5 "
Infusion of musk	75 "
" Siamese benzoin	125 "
Oil of cloves	15 "
" Mitcham lavender	10 "
" trefol (proprietary, clover odour)	50 "

Another Formula

Alcohol, 95 per cent.	6 l. 25 c.c.
Essence of synthetic jasmine	100 grams
" orange-flower	15 "
Synthetic neroli	5 "
Tincture of artificial musk	100 "
Infusion of Siamese benzoin	150 "
Coumarin	8 "
Trefolia (proprietary, clover odour)	50 "
Vanillin	5 "
Oil of cloves	8 "
Synthetic ylang-ylang	75 "

Another Formula

Infusion of rose, I	1 l. 225 c.c.
" jasmine, I	1 l. 850 "
" jonquil	600 c.c.
" tuberose	600 "
" ambergris	50 grams
Tincture of artificial musk	50 "
Synthetic neroli	5 "
Oil of bergamot	25 "
Synthetic ylang-ylang	5 "
Oil of cloves	5 "
Ionone	3 "
Infusion of benzoin	150 "
Amyl salicylic ether	100 "

TRIPLE AND QUADRUPLE EXTRACTS 151

• *White Clover*

Infusion of jasmine, I	6 l. 125 c.c.
„ „ cassia, I	1 l. 225 „
Oil of ylang-ylang	40 grams
„ „ cananga	25 „
Heliotropol (or heliotropin)	10 „
Coumarin	5 „
Infusion of musk	50 „
„ „ benzoin	150 „
Oil of rosewood	25 „
„ „ sandalwood	10 „
Orchidée (proprietary, odour based on amyl salicylate)	50 „

Another Formula

Tincture of synthetic rose, I	1 l. 225 c.c.
„ „ „ „ jasmine	500 c.c.
„ „ „ „ tuberose, I	650 „
„ „ „ „ mousse de chêne „	1 l. 225 c.c.
„ „ „ „ ambergris	615 c.c.
„ „ „ „ musk	125 grams
Dianthine (proprietary, clover odour)	5 „
Oil of neroli	5 „
„ „ „ „ sweet orange	15 „
„ „ „ „ bergamot	50 „
Synthetic ylang-ylang	40 „
Oil of rose	5 „
„ „ „ „ cloves	15 „
Orris	15 „
Orchidée	50 „

It should here be noted that trèfle essence, trefol, trefolia, and orchidée, etc., are, in substance, amyl salicylate. The only difference lies in the fact that in some cases a small amount of artificial musk is added to the ether.

Lily of the Valley

Infusion of cassia, I	1 l. 350 c.c.
„ „ „ „ rose, II	300 c.c.
Extract of ceranium, triple	675 „
„ „ „ „ sweet orange, triple	300 „
Infusion of tuberose, I	75 grams
Extract of musk, triple	950 c.c.
Infusion of orange, II	2 l. 680 c.c.

Lime Flowers

Tincture of synthetic jasmine	6 l. 125 c.c.
Infusion of musk	50 grams
„ „ „ „ benzoin	100 „
Bourbonal (proprietary, vanilla odour)	10 „
Oil of bergamot	25 „

Synthetic jasmine gives excellent results in preparing the

perfume "lime flowers." The following formula is also satisfactory :—

Tincture of synthetic cassie	1 l. 225 c.c.
" " jasmine	600 c.c.
Infusion of jonquil, II	600 "
Tincture of artificial civet	50 grams
" ambrettol (proprietary, ambergris-musk odour) ...	50 "
Essence of synthetic lime flowers	80 "
Geranyl formate	30 "
Oil of lemon	10 "
Hyacinth (artificial oil)	40 "
Essence of camomile	5 "

It should be remembered that artificial hyacinth oil is based on either bromostyrolene or phenylacetic aldehyde.

Muguet (Triple Extract)

Alcohol, 95 per cent.	11 litres
Infusior of musk	100 grams
Essence of jasmine	20 "
Infusion of benzoin	200 "
Vanillin	10 "
Oil of ylang-ylang	10 "
Synthetic lily of the valley	150 "

Muguet (Quadruple Extract)

Infusion of jasmine, I	2 l. 200 c.c.
" rose, I	1 l. 850 "
" cassie, I	360 c.c.
" violet, I	360 "
Tincture of synthetic orris	980 "
" " vanillin	150 grams
Infusion of civet	20 "
Linalol	140 "
Oil of ylang-ylang	40 "
" " jasmine	5 "
Terpineol	45 "
Tincture of chlorophyll (5 per cent.)	100 "

Malmaison

Infusion of rose, I	1 l. 225 c.c.
" orange, I	600 c.c.
" cassie, II	600 "
Synthetic carnation	50 grams
Infusion of jasmine, III	1 l. 840 c.c.
Bourbonal (proprietary, vanilla odour)	15 grams
isoEugenol	10 "
Infusion of musk	100 "
" benzoin	200 "

TRIPLE AND QUADRUPLE EXTRACTS 153

Pansy

Infusion of tuberose, III	2 l. 450 c.c.
„ rose, I	2 l. 450 „
Essence of synthetic pansy	70 grams
Grisambreno (proprietary, ambergris type)	5 „
Oil of ylang-ylang	3 „
„ lemon	8 „
Zibethine (civet) ..	3 „
Oil of neroli	4 „
Infusion of musk	50 „
„ benzoin	60 „
Vanillin	2 „

Narcissus

Infusion of tuberose, I • ..	1 l. 840 c.c.
„ jonquil, I ..	1 l. 840 „
Tincture of jasmine ..	1 l. 840 „
Infusion of storax ..	120 grams
„ musk ..	40 „
Synthetic narcissus ..	65 „
Tincture of vanillin ..	150 „
Heliotropol (heliotropin) ..	5 „
Orgeol (proprietary, rose odour) ..	3 „

Synthetic narcissus is based on phenylacetic aldehyde.

Oleander

Infusion of tuberose, I	2 l. 450 c.c.
„ jonquil, I	1 l. 225 „
„ orange, I	1 l. 225 „
Oil of geranium	100 grams
„ cedar wood ..	15 „
„ verbenæ ..	5 „
Infusion of Siamese benzoin	100 „
Tincture of artificial musk	50 „
Infusion oforris	1 l. 225 c.c.
Oil of ylang-ylang	5 grams
Essence of synthetic gardenia	5 „

Patchouli

As a base, infusion of rose is used, to which as the characteristic odour-bearer is added fine essence of patchouli, and as fixatives storax and musk. To the extract, other compound extracts are also often added, thereby obtaining many excellent variations. The extracts which lend themselves best to this combination are those of bergamot and ylang-ylang. Rose patchouli—the most popular—is frequently nothing more than patchouli to which rose perfume has been added, or else rose perfume toned down with a small quantity of patchouli. The ordinary extracts of patchouli are formed merely of alcoholic

TRIPLE AND QUADRUPLE EXTRACTS 155

There exist many varieties of rose which differ, not only in colour and in shape, but also in perfume. "Maréchal Niel" is one of the most popular, and its perfume is obtained by adding essence of neroli, a trace of melilone, and a small quantity of infusion of jasmine to essence of rose. Melilone can be replaced by coumarin, which it resembles.

"Moss Rose" is also popular, and to reproduce its perfume the subjoined formulæ for rose perfume are taken as a base and small quantities of neroli are added, also infusion of "mousse de chêne" and a trace of coumarin.

Infusion of rose, I	7 l. 350 c.c.
Solution of otto of rose	400 grams
Artificial oil of rose	30 "
Oil of rosewood ("bois de rose") ..	20 "
Infusion of musk	10 "
" tolu	50 "

White Rose

Tincture of artificial rose	7 l. 350 c.c.
Oil of patchouli	3 grams
" geranium	10 "
" artificial rose	15 "
Linalol	5 "
Oil of bergamot	10 "
Infusion of benzoin	100 "

Rosiris

Infusion of rose, I	8 l. 500 c.c.
Solution of otto of rose	550 c.c.
Infusion of musk	100 grams
Artificial oil of rose	25 "
Infusion of benzoin	50 "
Oil of rosewood	10 "
Vanillin	10 "
Concrete oil of orris	80 "
Oil of bergamot	20 "

Moss Rose

Tincture of artificial rose	7 l. 350 c.c.
Oil of neroli	5 grams
Infusion of "mousse de chêne"	1 l. 225 c.c.
Artificial rose oil	30 grams
Infusion of benzoin	100 "
Tincture of artificial musk	150 "

Tea Rose

Tincture of artificial rose, I	2 l. 150 c.c.
" tuberose, II	2 l. 150 "
Extract of vanilla	1 l. 100 "
" geranium	1 l. 100 "
Tincture of coumarin	75 grams

"Murechal Niel" Rose

Tincture of artificial rose, I	6 l. 125 c.c.
Bulgarian otto of rose	5 grams
Infusion of tolu	75 "
" musk	20 "
Synthetic neroli	15 "
Oil of cloves	1 "
Tincture of artificial tuberose, I ..	600 c.c.
Vanillin	1 gram
Coumarin	0.5 "

Mignonette

Alcohol, 95 per cent.	6 l. 125 c.c.
Concrete essence of orris	3 grams
Infusion of musk	25 "
Artificial musk	0.5 gram
Oil of cloves	1 "
" sandalwood	1.5 grams
Infusion of balsam of Peru	125 "
Synthetic mignonette	70 "
Oil of jasmine	20 "

Another Formula

Alcohol, 95 per cent.	5 l. 500 c.c.
Oil of geranium	10 grams
" bergamot	20 "
Solution of orris oil	250 "
Infusion of musk	50 "
" balsam of Peru	50 "
Essence of mignonette	40 "
Oil of jasmine	5 "

Sandalwood

Alcohol, 95 per cent.	3 l. 600 c.c.
Oil of geranium	30 grams
" sandalwood	80 "
" patchouli	5 "
Infusion of violet, II	500 "
Extract of bergamot, II	300 "
Tincture of coumarin	100 "
" artificial musk	50 "
" " orange, II	250 "

Stephanotis

Infusion of tuberose, I	1 l. 225 c.c.
" rose, I	2 l. 450 "
" jasmine, I	2 l. 450 "
" orris root	5 l. 500 "
Tincture of artificial musk	600 c.c.
Synthetic ylang-ylang	10 grams
Otto of rose	25 "
Oil of bergamot	30 "
" rosewood	20 "

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Syringa

Tincture of artificial orange, 1	1 l. 840 c.c.
" " cassie, 1	600 c.c.
Extract of mignonette, triple	600 "
Tincture of synthetic jasmine, 1	600 "
Infusion of musk	30 grains
Essence of syringa	5 "
	40 "

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Tuberose

An exquisite perfume, but inclined to be strong. As a base of the perfume, concrete essence of tuberose is used, and to this is added a little vanillin and essence of ylang-ylang, and if needed a little essence of rose. As fixatives, musk and benzoin are employed. Special shades of the perfume are obtained by judicious use of oil of bergamot. If it is desired to obtain a practically pure extract of tuberose, essence of tuberose is dissolved in an infusion of jasmine, and the resulting solution is used as a base.

Infusion of tuberose	4 l. 300 c.c.
Essence of tuberose (concrete)	10 grains
Vanillin ..	10 "
Tincture of artificial musk	50 "
Infusion of benzoin	50 "
Synthetic ylang-ylang	2 "

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Vanilla

Tincture of vanilla	4 l. 900 c.c.
Extract of musk, triple	1 l. 850 "
Synthetic ylang-ylang	5 grains

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Verbena

This extract possesses a very fine rustic odour, refreshing but inclined to be a little strong. The following is the formula :—

Alcohol, 95 per cent.	4 litres
Essence of verbena	50 grains
" " sweet orange	150 "
Citral	15 "
Tincture of synthetic jasmine, II	1 l. 225 c.c.
Infusion of orris, I	1 l. 225 "
Solution of oil of sandalwood (1 in 10)	25 grains
Tincture of artificial musk	20 "
" " civet	15 "

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Velivert

Alcohol, 95 per cent.	3 l. 650 c.c.
Essence of velivert ..	65 grains
" " jasmine	5 "
Vanillin	10 "
Essence of artificial rose	10 "
Tincture of artificial civet	40 "
Infusion of tolu	50 "

Vine Flowers

A very fine perfume, recalling the penetrating odour given out by the Alsatian vines when in blossom. As a base, a weak infusion of jasmine mixed with an infusion of rose is taken, and added to this is the artificial essence of vine blossom, a little vanillin, orgeol (proprietary, rose odour), and a trace of essence of bitter almonds. As fixatives, infusions of musk and benzoin are employed. The following is also a satisfactory formula :—

Alcohol, 95 per cent.	5 l. 500 c.c.
Artificial essence of vine blossom	150 grams
Vanillin	8 "
Tincture of artificial civet	20 "
Infusion of benzoin	100 "
Anarylline (proprietary, daffodil odour) ..	5 "
Orgeol (proprietary, rose odour) ..	3 "
Vanilla	10 "

Ylang-ylang

Infusion of jasmine, I	4 l. 900 c.c.
„ jasmine, II	2 l. 450 "
„ benzoin	150 grams
„ musk	30 "
Oil of bitter almonds	3 "
„ ylang-ylang	120 "
Tincture of artificial rose, II	3 l. 675 c.c.

Ylang-ylang (Quadruple)

Infusion of jasmine, I	1 l. 850 c.c.
„ tuberosc, I	1 l. 850 "
„ violet, I	500 c.c.
Solution of orris oil (1 in 1000)	1 l. 850 c.c.
Vanillin	5 grams
Infusion of musk	30 "
„ ambergris	200 "
„ civet	30 "
Solution of essence of rose	300 "
Oil of ylang-ylang	45 "
Otto of rose	3 "

"Avion"

Alcohol, 95 per cent.	750 c.c.
Infusion of jasmine	250 grams
„ vanillin	30 "
French otto of rose	6 "
Oil of geranium	3 "
„ sandalwood	5 "
Synthetic oil of neroli	4 "
Ammonia, 0.910	5 drops
Geranyl formate	3 grams
Heliotropin	3 "
Terpineol	4 "

"Baiser de Rome"

Tincture of musk	3 litres
Infusion of tuberose, II	2 "
" rose, I	2 "
Tincture of heliotropin	120 grams
Bourbonal (proprietary, vanilla odour)	30 "
Artificial rose oil	20 "
" jasmine oil	15 "
Infusion of benzoin	250 "
Terpineol	40 "
Hyacinth (artificial oil)	5 "
Liquid essence of orris	15 "

"Bouquet de Carmen"

Infusion of cassie, I	5 litres
" orange, I	2 l. 500 c.c.
" Siamese benzoin	500 c.c.
Tincture of musk (ambrette)	1 l. 500 c.c.
" ambergis	300 c.c.
Otto of rose	15 grams
Vanillin	5 "
Essence of artificial bergamot	100 "
" rostrus	15 "
" cassie	15 "

"Brisa de Las Pampas"

Tincture of artificial rose, I	1 l. 225 c.c.
" synthetic jasmine, I	2 l. 450 "
" orange, I	3 l. 675 "
Infusion of orris	1 l. 225 "
Tincture of vanillin	200 grams
" coumarin	50 "
Synthetic oil of rose	3 "
Tincture of artificial musk	300 "
Oil of bergamot	15 "
Citral	10 "
Eugenol	2 "
Geraniol	10 "
Oil of patchouli	10 "
" palmarosa	20 "
Turanc (proprietary, floral odour)	20 "
Infusion of tota	150 "
Tincture of artificial civet	50 "

"Perfume Idéal"

This fancy perfume, of exquisite odour, was first prepared by the firm of Houbigant & Co. An excellent example of the type is obtained by taking as base infusions of rose, orange, jasmine, cassie, and nasturtium. To these are added infusion of "mousse de chêne" and tincture of bourbonal (proprietary, vanilla odour); also essence of rose to taste, oils of bergamot, and ylang-ylang, ionone, iraldeine (proprietary, violet-orris odour), oil of neroli, traces of coumarin, isoeugenol, essence of

mandarin, and vetivert. Fixatives used are musk and civet.

Appended are two formulæ for the product:—

Infusion of rose, I	2 l. 500 c.c.
„ „ moussé de chêne ”	1 l. 500 „
„ cassie, I	1 litre
„ jasmine, I	1 „
„ orange, I	500 c.c.
„ nasturtium	500 „
Iraldeine	15 grams
Oil of ylang-ylang	10 „
Commurin	10 „
Oil of neroli	15 „
isoEugenol	2 „
Artificial musk	15 „
Tincture of vanillin	1 l. 500 c.c.
Oil of rose „	80 grams
„ bergamot „	40 „
Infusion of civet	80 „
Oil of vetivert	5 „

Ideal, Extra

Infusion of rose, I	4 l. 300 c.c.
„ „ jasmine, I	1 litre
„ „ orange, I	1 „
„ „ cassie, I	1 „
Tincture of vanillin	2 l. 500 c.c.
„ „ civet	100 grams
Oil of bergamot	80 „
„ rose	85 „
„ lavender	25 „
„ mandarin	20 „
„ artificial neroli	10 „
„ ylang-ylang	20 „
„ cloves	2 „
Iraldeine	20 „
Commurin	25 „
Artificial musk	30 „
Oil of costus	3 „

“Bouquet de Cachemire”

Infusion of violet, I	1 l. 225 c.c.
„ „ rose, I	1 l. 850 „
„ „ benzoin	500 c.c.
Tincture of artificial civet	300 „
„ „ coumarin	300 „
Essence of patchouli	20 grams
Ionone	6 „
Linalol	30 „

“Cœur de Jeannette”

Infusion of jasmine	3 litres
„ „ „ rose	1 litre
„ „ Siamese benzoin	400 c.c.
„ „ musk	100 „
Vanillin	40 grams

TRIPLE AND QUADRUPLE EXTRACTS 161

Oil of mimosa (artificial)	15 grams
„ narcissus (artificial)	25 „
„ rose	10 „
„ syringa (artificial)	40 „
Indole.....	2 „
Natural oil of neroli	12 „

“ Côte d’Azur ”

Alcohol, 95 per cent.	6 l. 125 c.c.
Synthetic jasmine	200 grams
Essence of cassie	25 „
Anisic aldehyde	5 „
Artificial oil of rose	15 „
Vanillin	8 „
Infusion of Siamese benzoin	150 „
„ musk	100 „
Tincture of artificial civet	25 „
Oil of vetiver	3 „

The six litres of alcohol can be replaced by equal parts of infusions of rose and cassie II and adding 2 litres of infusion of orris. In this way, a good product is obtained, but the cost of manufacture is higher.

“ Chypre ”

This perfume is very old established and much valued. It is usually prepared by mixing several other compound perfumes — such as musk and verberna extracts—to which are added oils of rose, sandalwood, and bergamot. As a fixative, infusion of benzoin is used. Sometimes a little safrole or oil of sassafras may be added. The following formula may also be used.

Tincture of synthetic cassie, I	4 l. 600 c.c.
Extract of musk, triple	4 l. 600 „
„ verberna, triple	4 litres
Safrole	40 grams
Oil of sandalwood	40 „
Tincture of artificial musk	20 „

Japanese Corylopsis

The corylopsis grows in Japan and bears flowers of various colours. The perfume, like that of the orchid, is very strong, though a little sickly. It is prepared artificially by taking infusions of rose and jasmine, and adding thereto a little tuberose and orange; to finish, add oils of rose and ylang-ylang, vanillin and geraniol, traces of vetiver, lily of the valley, and oil of patchouli. The addition of a little strawberry ether gives an excellent shade to it.

Fixatives.—Musk and benzoin, strengthened by a little musk-ambrette.

Alcohol, 95 per cent.	8 l. 600 c.c.
Oil of jasmine (synthetic)	55 grams
" " rose	40 ..
Artificial musk	5 ..
Oil of cananga	40 ..
" ylang-ylang	30 ..
Vanillin	2 ..
Infusion of benzoin	100 ..
Synthetic lily of the valley	10 ..
Oil of patchouli	10 ..
Strawberry ether (artificial essence of strawberry)	180 ..
Oil of vetiver	0.5 gram
Geraniol	10 grams

* The strawberry ether should be used cautiously, as it varies considerably, and in some cases far less than 180 grams should be used.

Sweet Pea

Tincture of synthetic orange, 1	1 l. 225 c.c.
" " tuberose, 1	250 c.c.
" " rose, 1	250 ..
Vanillin	5 grams
Rose-water	600 c.c.
Orange-blossom water	600 ..

A little terpineol may be added here.

Extract of "Cœur de Russie"

Tincture of synthetic rose, 1	4 l. 900 c.c.
" " orange, 1	4 l. 900 ..
" " orris, 1	2 l. 450 ..
Synthetic oil of rose	30 grams
isoEugenol	15 ..
Oil of bergamot	100 ..
Synthetic neroli	10 ..
Tincture of artificial musk	100 ..
" " civet	20 ..
Synthetic broom	30 ..
Infusion of storax	100 ..
Yara-yara	2 ..
Rose-water	1 l. 225 c.c.

"Peau d'Espagne"

The shades of this perfume vary with the taste of the perfumer. As a base infusion of cassie is used to which are added oils of bergamot, sandalwood, and vetiver. A beautiful perfume is obtained by adding concrete "mousse de chêne" and a little

TRIPLE AND QUADRUPLE EXTRACTS 163

oil of Niobe. As fixatives, infusions of musk, civet, and tolu are used.

Alcohol, 95 per cent.	6 l. 125 c.c.
Essence of natural cassie	25 grams
Oil of sandalwood	50 "
" Niobe	30 "
" bergamot	100 "
Tincture of artificial musk	1 l. 225 c.c.
" " civet	1 l. 225 "
Infusion of tolu	1 l. 825 "
Essence of vetiver	20 grams
Turanol (proprietary, floral odour)	5 "

"Mousse de chêne" may be added according to taste.

"Vice-Reine"

Infusion of rose, I	1 l. 225 c.c.
" cassie, I	1 l. 225 "
" tuberose, I	1 l. 225 "
" musk	150 grams
" ambergris	40 "
Tincture of artificial civet	40 "
Synthetic violet	20 "
Concrete essence of orris	20 "
Oil of rose	10 "
Essence of bergamot	50 "
Synthetic neroli	15 "
Santal oil	20 "

This formula gives an imitation of a perfume offered by an Indian Rajah to Lady Curzon, wife of the then Viceroy of India.

"Unir de Russie"

Tincture of synthetic cassie, I	1 l. 800 c.c.
Extract of geranium, triple	1 l. 800 "
Tincture of synthetic rose, I	4 l. 300 "
" vanillin	1 l. 225 "
Solution of orris	1 l. 225 "
Synthetic "unir de Russie"	150 grams
Tincture of synthetic jasmine	1 l. 800 c.c.
Grisambrene (proprietary, ambergris type)	10 grams

Ess-Bouquet

To prepare this perfume a mixture of infusions of rose, cassie, and tuberose should be taken as a base, and to this must be added essences of bergamot, rosewood, and mignonette. As fixatives, infusions of musk and tolu are used. To give more body to the perfume, already completed perfumes are frequently added such as mignonette perfume or bergamot perfume. The

addition of a little violet gives excellent results, or the following formula may be used :—

Tincture of synthetic rose, I	2 l. 450 c.c.
" " cassie, I	1 l. 225 "
" " tuberosc, I	1 l. 225 "
Extract of nignonette, triple	3 litres
" bergamot	2 l. 500 c.c.
Essence of rosewood	10 grams
" bergamot	50 "
Infusion of musk, I	100 "
Tincture of artificial civet, I	50 "
Infusion of tolu	100 "
Thiuranol (proprietary, floral odour).	3 "

Jockey Club (Triple)

Infusion of tuberosc, I	600 c.c.
" orange, I	600 "
" cassie, I	600 "
Orgeol (proprietary, rose odour)	15 grams
Extract of English honey, triple	1 l. 225 c.c.
Bouvardia (proprietary, fancy perfume)	20 grams
Extract of medlar, artificial	10 "
Infusion of jasmine	1 l. 225 c.c.
" storax	250 grams
Liquid essence of orris	15 "
Alcohol, 95 per cent.	2 l. 450 c.c.

Jockey Club (Quadruple)

Infusion of cassie, I	1 l. 225 c.c.
" orange, I	600 c.c.
" tuberosc, I	300 "
" rose, I	1 l. 225 c.c.
Oil of orris	2 grams
" rose (free from stearoptene)	15 "
" bergamot	40 "
Infusion of anthergris, I	200 "
" orris	1 l. 225 c.c.
" liquid storax	200 grams
Bouvardia	20 "
Alcohol, 95 per cent.	1 litre

Frangipani

A very old perfume, prepared from various formulæ. The best base to use is a combination of infusions of cassie and rose. To complete, add heliotropin, essences of carnation, santal, neroli, synthetic bergamot, and coumarin.

As fixatives, musk and benzoin. The following formula also may be used :—

TRIPLE AND QUADRUPLE EXTRACTS

165

Tincture of heliotropin	1 l. 225 c.c.
„ „ artificial musk	100 grams
Synthetic oil of rose	10 „
Tincture of coumarin	180 „
„ „ synthetic cassie	1 l. 225 c.c.
Oil of cedarwood	10 grams
„ „ sandalwood	2 „

“ Bouquet des Geishas ”

Tincture of artificial musk	3 l. 180 c.c.
„ „ „ civet	6 l. 125 „
Vanillin	490 c.c.
Coumarin	200 grams
Heliotropin	400 „
Tincture of synthetic jasmine	8 litres
Oil of geranium	25 grams
Anisic aldehyde	10 „
Turanol (proprietary, floral odour)	10 „
Oil of sweet orange	20 „
„ „ bergamot	50 „

“ Brise d'Alsace ”

Tincture of synthetic rose, I	5 l. 500 c.c.
„ „ „ jasmine, I	1 l. 225 „
„ „ „ orange, I	1 l. 450 „
„ „ „ cassie, I	2 l. 450 „
„ „ vanillin	2 l. 450 „
„ „ artificial civet	100 grams
Oil of bergamot	80 „
„ „ mandarin	20 „
Synthetic neroli	10 „
Oil of rose	100 „
„ „ lavender	25 „
„ „ verbena	5 „
isoEugenol	3 „
Synthetic ylang-ylang	20 „
Indole (proprietary, violet-orris odour)	5 „
Coumarin	25 „
Artificial musk	30 „

“ Kadsuga ”

Tincture of synthetic tuberose, I	1 l. 225 c.c.
„ „ „ rose, I	2 l. 450 „
„ „ „ jasmine, I	2 l. 450 „
Infusion of ambrette seed	1 l. 225 „
„ „ orris root	5 l. 500 „
Tincture of artificial musk	600 c.c.
Irolene (proprietary, orris-violet odour)	5 grams
Infusion of labdanum	150 „
Oil of rose	25 „
Citral	5 „
Oil of rosewood	20 „
Heliotropin	40 „

"Délices de Suzy"

Tincture of synthetic rose, I	2 l. 480 c.c.
" " jasmine, I	2 l. 450 "
Infusion of violet, II	2 l. 450 "
" violet, III	2 l. 450 "
" tolu	200 grams
" benzoïn	200 "
Tincture of artificial musk	250 "
" civet	100 "
Oil of bergamot	200 "
Citral	10 "
Linaloe oil	80 "
Eugenol	5 "
Liquid oil of orris	40 "
Sandalwood oil	40 "

"Bouquet Maréchal"

Infusion of jasmine, III	2 l. 450 c.c.
Extract of violet, triple	1 l. 225 "
" carnation, triple	1 l. 225 "
Tincture of artificial orange, I	250 grams
" synthetic jasmine, I	250 "
" rose, I	250 "
" artificial musk, I	60 "
Oil of sandalwood	5 "
Infusion of benzoïn	60 "
" tolu	60 "
Bouvardia	10 "

"Extract of English Honey" (Triple)

Infusion of jasmine, I	2 l. 450 c.c.
" tuberose, I	2 l. 450 "
Vanillin	5 grams
Liquid oil of orris	20 "
Infusion of Siamese benzoïn	200 "
" musk, I	20 "
" civet	20 "
Palmarosa oil	10 "
Oil of cloves	10 "
Linalyl acetate	1 l. 250 c.c.
Alcohol, 95 per cent.	1 l. 250 "

English Honey (Quadruple)

Infusion of rose, III	3 l. 920 c.c.
" cassia, II	1 l. 470 "
" rose, II	1 l. 470 "
" jasmine, II	1 l. 470 "
Solution of orris	100 grams
Infusion of orris	300 "
" tolu	60 "
" balsam of Peru	110 "
" storax	225 "
" musk	150 "
Oil of bergamot	500 "
" lemon	80 "
" cloves	15 "
Saffrole	15 "
Oil of geranium	25 "

• *Rustic Flowers*

Tincture of synthetic jasmine, 1	3 l. 675 c.c.
„ „ tuberosc, 1	1 l. 225 „
„ „ orris	1 l. 225 „
Infusion of tolu	300 grams
Tincture of artificial musk	5 „
Coumarin	20 „
Heliotropin	15 „
Oil of petitgrain	10 „
„ bergamot	80 „
„ cloves	20 „
„ verbenä	5 „

• *“ Bouquet de Mikado ”*

Tincture of synthetic jasmine, 1	3 l. 125 c.c.
„ „ rose, 1	2 l. 450 „
Oil of vetiver	12 grams
„ patchouli	16 „
„ geranium	16 „
„ rose (synthetic)	26 „
„ cloves	10 „
„ bitter almonds	10 „
„ bergamot	60 „
Tincture of artificial musk	250 „
Agfa fixativ	100 „
Tincture of artificial civet	250 „
„ coumarin	1 l. 840 c.c.
„ vanillin	1 l. 840 „
“ Aroma of wax ” (proprietary, beeswax odour)	10 grams

• *“ Mille-Flours ”*

The composition of this perfume varies considerably, according to the taste of the maker. On a base of infusion of rose a very fine quality extract is obtainable, and added to this are infusions of jasmine and narcissus. To finish the preparation, oils of bergamot, geranium, neroli, ylang-ylang, traces of hyacinth, a little in leue, terpeneless oil of sweet orange, heliotropin, and vanillin are employed. Fixatives—infusions of musk and tolu. Or the following formula may be adopted :—

Extract of English honey, triple	8 l. 940 c.c.
„ geranium, triple	1 l. 960 „
„ bergamot, triple	1 l. 960 „
Orgeol	10 grams

• *Musk (Triple)*

A select perfume, though a little overpowering. Good results are forthcoming by taking as a base infusions of jasmine and rose, and adding thereto infusion of musk to taste. To complete

the process, use infusion of rose, a little cassie, concrete orris in solution, and musk-ambrette. Fix with infusions of benzoin and tolu.

Infusion of rose, 1	1 l. 225 c.c.
" tuberose, 1	980 c.c.
" orange, 1	1 l. 960 c.c.
" cassie, 1	980 c.c.
Vanillin	4 grams
Infusion of musk, 1	550 c.c.
" ambrette seed	300 "
Orgeol	20 grams
Artificial musk	10 "

Opopanax (Triple)

Infusion of rose, 1	3 l. 180 c.c.
" jasmine, 1	3 litres
" tuberose, 1	3 "
Essence of opopanax	110 grams
" lavender	30 "
Infusion of benzoin	530 c.c.
Tincture of citral	530 "
Solution of orris	530 "
Oil of patchouli	10 grams
" lemon	120 "
Geraniol	30 "
Infusion of musk, 1	125 "
Tincture of artificial civet	25 "

Opopanax (Quadruple)

Infusion of rose, 1	1 l. 840 c.c.
" orange, 1	1 l. 225 "
" violet, 1	1 l. 225 "
Oil of orris	5 grams
Infusion of musk	3 "
Vanillin	5 "
Citral	10 "
Oil of bergamot	100 "
" opopanax	30 "
Orgeol	20 "
Oil of Algerian geranium	10 "
Infusion of ambrette seed	300 "
Geranyl acetate	25 "
Alcohol, 95 per cent.	1 l. 225 c.c.

Orchid

There are some hundreds of varieties of orchids, the flowers of which all have a different perfume. In fact, many have undefinable scents and thus the perfumer is allowed free play to his imagination in the composition of the perfumes of this flower.

• *Rustic Flowers*

Tincture of synthetic jasmine, 1	3 l. 675 c.c.
„ „ tuberosc, 1	1 l. 225 „
„ „ orris	1 l. 225 „
Infusion of tolu	300 grams
Tincture of artificial musk	5 „
Coumarin	20 „
Heliotropin	15 „
Oil of petitgrain	10 „
„ bergamot	80 „
„ cloves	20 „
„ verbenä	5 „

• *“ Bouquet de Mikado ”*

Tincture of synthetic jasmine, 1	3 l. 125 c.c.
„ „ rose, 1	2 l. 450 „
Oil of vetiver	12 grams
„ patchouli	16 „
„ geranium	16 „
„ rose (synthetic)	26 „
„ cloves	10 „
„ bitter almonds	10 „
„ bergamot	60 „
Tincture of artificial musk	250 „
Agfa fixativ	100 „
Tincture of artificial civet	250 „
„ coumarin	1 l. 840 c.c.
„ vanillin	1 l. 840 „
“ Aroma of wax ” (proprietary, beeswax odour)	10 grams

• *“ Mille-Flours ”*

The composition of this perfume varies considerably, according to the taste of the maker. On a base of infusion of rose a very fine quality extract is obtainable, and added to this are infusions of jasmine and narcissus. To finish the preparation, oils of bergamot, geranium, neroli, ylang-ylang, traces of hyacinth, a little in leue, terpeneless oil of sweet orange, heliotropin, and vanillin are employed. Fixatives—infusions of musk and tolu. Or the following formula may be adopted :—

Extract of English honey, triple	8 l. 940 c.c.
„ geranium, triple	1 l. 960 „
„ bergamot, triple	1 l. 960 „
Orgeol	10 grams

• *Musk (Triple)*

A select perfume, though a little overpowering. Good results are forthcoming by taking as a base infusions of jasmine and rose, and adding thereto infusion of musk to taste. To complete

Spring Flowers

Infusion of cassie, I	1 l. 840 c.c.
.. orange, I	1 l. 225 "
.. violet, I	1 l. 225 "
.. violet, II	2 l. 225 "
Extract of bergamot, triple	1 l. 960 "
.. sweet orange, triple	1 l. 960 "
Oil of sandalwood	10 grams
Thranol (proprietary, floral odour)	5 "
Oil of geranium	60 "
Tincture of artificial musk	100 "
.. .. civet	10 "
Essence of syringa	10 "
Tincture of vanillin	300 "
Acetic ether	40 drops

"Volkameria"

Alcohol, 95 per cent.	6 l. 125 c.c.
Violet (artificial ionone) ..	10 grams
Essence of tuberose	10 "
.. .. jasmine	10 "
Orgeol	5 "
Aubepine, liquid	5 "
Synthetic hyacinthi	20 "
Infusion of benzoin	150 "
.. .. civet	40 "

"Evening Breeze"

Tincture of synthetic jasmine, I	3 l. 675 c.c.
.. .. cassie, I	1 l. 225 "
.. .. rose, I	2 l. 450 "
Coumarin	80 grams
Heliotropin	25 "
Bourbonal (proprietary, vanilla odour)	10 "
Oil of juniper	40 "
Bornyl acetate	30 "
Tincture of artificial musk	150 "
Cheliranthia (artificial wallflower)	40 "
Thranol	20 "
Oil of bergamot	50 "
Infusion of tolu	150 "

Extracts of Violet

There exists, possibly, no perfume so esteemed by the public as that of violet, a perfume at once sweet and penetrating, lasting but not pungent, distinguished but not too exclusive. The ancient Florentines, a people of ultra-refined taste, had a special predilection for this perfume with its cultured sweetness, which they could extract from orris root. It is not to be wondered at, that modern chemists have been forced to reproduce the violet perfume by synthetic means, and they have fully succeeded by their discovery of ionone, the judicious use of which allows

of, not only the preparation of an excellent extract of violet from a commercial point of view, but also of a degree of strength of perfume hitherto unknown in these extracts. The tinctures of ionone reproduce this perfume in a remarkable manner, but, like all such synthetic products, the perfume tends to be coarse and elementary—it lacks the sweetness and the “finesse” which only natural products can possess.

Haarmann and Reimer carried out researches to remedy these drawbacks, and their latest violet extract approaches more nearly to perfection, and it gives tinctures which strikingly resemble the infusions of pomades.

In spite of this, extracts of violet (extra fine) are always prepared with pomade infusions which nothing can replace, and one must be content with strengthening them with the addition of ionone. But, as we have already remarked, the uncontrolled use of ionone presents certain difficulties, for this product acts on the sense of smell with such vigour that persons who make a habit of using it finish by no longer appreciating the natural perfume of the violet. It is true, however, that a prolonged stay in the open air and abstinence from synthetic perfumes are sufficient, after a while, to restore vitality to the olfactory nerves.

It is very important to use ionone and the fresh violet diluted in a certain proportion in order to obtain the full strength of the perfume, and to associate other suitably chosen perfumes with them in order to obtain the bouquet of the violet. It is not enough to make a simple solution of 10 per cent. of ionone in alcohol in order to obtain a fine extract, as this perfume can only gain its full value when in association with a whole series of other perfumes which must be chosen and regulated by the maker (see formulæ appended).

To obtain extracts the perfumes of which are harmoniously blended, it is well, as has been previously stated, to operate upon relatively large quantities; say from 15 to 20 litres. Next, after measuring out and mixing the various constituents, the mixture should be allowed to stand a fortnight before filtration. After filtration, the product must be kept in well-filled vessels, carefully stoppered, away from the light, in a cool and airy cellar. At the end of five or six weeks the product is ready for placing in bottles for sale.

Furthermore, it is equally to be desired that the infusions and solutions used, prepared in not too small quantities, should have

Spring Flowers

Infusion of cassie, I	1 l. 840 c.c.
.. orange, I	1 l. 225 "
.. violet, I	1 l. 225 "
.. violet, II	2 l. 225 "
Extract of bergamot, triple	1 l. 960 "
.. sweet orange, triple	1 l. 960 "
Oil of sandalwood	10 grams
Thranol (proprietary, floral odour)	5 "
Oil of geranium	60 "
Tincture of artificial musk	100 "
.. .. civet	10 "
Essence of syringa	10 "
Tincture of vanillin	300 "
Acetic ether	40 drops

"Volkameria"

Alcohol, 95 per cent.	6 l. 125 c.c.
Violet (artificial ionone) ..	10 grams
Essence of tuberose	10 "
.. jasmine	10 "
Orgeol	5 "
Aubepine, liquid	5 "
Synthetic hyacinthi	20 "
Infusion of benzoin	150 "
.. .. civet	40 "

"Evening Breeze"

Tincture of synthetic jasmine, I	3 l. 675 c.c.
.. .. cassie, I	1 l. 225 "
.. .. rose, I	2 l. 450 "
Coumarin	80 grams
Heliotropin	25 "
Bourbonal (proprietary, vanilla odour)	10 "
Oil of juniper	40 "
Bornyl acetate	30 "
Tincture of artificial musk	150 "
Chiranthia (artificial wallflower)	40 "
Thranol	20 "
Oil of bergamot	50 "
Infusion of tolu	150 "

Extracts of Violet

There exists, possibly, no perfume so esteemed by the public as that of violet, a perfume at once sweet and penetrating, lasting but not pungent, distinguished but not too exclusive. The ancient Florentines, a people of ultra-refined taste, had a special predilection for this perfume with its cultured sweetness, which they could extract from orris root. It is not to be wondered at, that modern chemists have been forced to reproduce the violet perfume by synthetic means, and they have fully succeeded by their discovery of ionone, the judicious use of which allows

TRIPLE AND QUADRUPLE EXTRACTS 173

(triple). The shade of the odour will vary according to the exact artificial violet used, *e. g.* ionone, *alpha*-ionone, *beta*-ionone, "new violet," etc.

Parma Violets

Infusion of violet, I	6 l. 125 c.c.
„ rose, II	1 l. 225 „
„ jasmine, III	1 l. 850 „
„ orange, II	1 l. 225 „
„ orris, I	2 l. 450 „
„ musk, I	20 grams
Oil of ylang-ylang	12 „
Artificial violet ("new violet")	40 „

Russian Violets

Infusion of violet, I	6 l. 125 c.c.
„ violet, III	2 l. 450 „
„ rose, II	1 l. 225 „
„ orange, III	2 l. 450 „
„ jasmine, II	2 l. 450 „
Oil of ylang-ylang	10 grams
Concrete oil of orris	5 „
Ionone	35 „

Mountain Violets

Infusion of violet, I	6 l. 125 c.c.
„ violet, II	2 l. 450 „
„ cassia, II	600 c.c.
„ jasmine, II	1 l. 225 c.c.
„ musk, I	50 grams
Oil of ylang-ylang	20 „
Jonarol	30 „

March Violets

Infusion of violet, I	6 l. 125 c.c.
„ violet, III	3 l. 680 „
„ jasmine, I	1 l. 225 „
„ rose, I	1 l. 225 „
„ Siamese benzoin	100 grams
„ orris, I	100 „
Tincture of coumarin	100 „
Artificial violet ("new violet")	20 „
Oil of ylang-ylang	10 „
„ bitter almonds	0.5 gram

San Remo Violets

Infusion of violet, I	3 litres
„ jasmine, I	1 l. 225 c.c.
„ rose, I	1 l. 225 „
„ cassia, I	2 l. 450 „
Iralin (proprietary, orris odour)	20 grams
Tincture of vanillin	100 „
„ artificial orris	1 l. 225 c.c.
Violettone	200 grams
Infusion of musk, I	100 „
„ orris	3 l. 100 c.c.
Artificial oil of ylang-ylang	20 grams

Nice Violets

Infusion of violet, I	4 l. 900 c.c.
„ jasmine, I	3 l. 680 „
„ cassie, I	1 l. 840 „
„ rose, I	1 l. 840 „
„ musk	600 c.c.
Ionone	250 grams
Oil of geranium	30 „
„ orris	30 „
Vanillin	10 grams
Alcohol, 95 per cent.	4 l. 500 c.c.

Spring Violets

Infusion of violet, I	7 l. 350 c.c.
„ rose, I	2 l. 450 „
„ jasmine, I	950 c.c.
„ cassie, I	250 grams
„ benzoin	50 „
„ musk	50 „
Tincture of coumarin	50 „
Solution of essence of rose	100 „
Tincture of vanillin	100 „
Violettone	40 „

Vera Violetta

An excellent perfume in great demand. Violet forms the base of it—an infusion of violet is taken and to it are added infusions of rose, cassie, jasmine, and orange, concrete orris, ionone, and essence of ylang-ylang in sufficient quantities to allow the perfume of violets to predominate. As fixatives use musk and benzoin.

Infusion of violet	5 l. 500 c.c.
Tincture of rose, I	1 l. 225 „
„ cassie, I	1 l. 225 „
„ jasmine, I	1 l. 225 „
„ orange, I	600 c.c.
Solution of orris	2 l. 450 c.c.
Infusion of musk	15 grams
Oil of rosewood	5 „
Violettol (or ionone)	50 „

Note that these tinctures should be of the same strength as the corresponding infusions from pomades.

White Violets

Tincture of irisolette, I (artificial violet; or ionone)	6 l. 125 c.c.
„ irisolette, II	3 litres
„ rose, I	1 l. 125 c.c.
„ orange, I	500 c.c.
„ jasmine, I	1 l. 250 c.c.
Artificial essence of ylang-ylang	15 grams
Concrete oil of orris	10 „
Ionone	50 „
Infusion of benzoin	200 „

Wood Violets

Infusion of violet, I	3 litres
.. jasmine, II	250 grams
.. rose, II	200 "
.. cassie, II	200 "
.. musk	10 "
.. benzoin	50 "
Artificial oil of rose	3 "
.. ylang-ylang	3 "
Irisolette (artificial violet; or ionone)	20 "

There are also certain bouquets of violet prepared solely with synthetic perfumes; we shall designate them simply by numbers, and the perfumer can apply whatever name his fancy dictates.

Violet Perfume I

Tincture of ionone	6 l. 125 c.c.
.. artificial oil of rose	1 l. 225 "
.. .. jasmine	1 l. 225 "
.. .. orange	300 grams
.. concrete orris (1 in 100)	3 l. 680 c.c.
.. artificial musk	50 grams
Essence of ylang-ylang	10 "
Infusion of benzoin	200 "

Violet Perfume II

Tincture of artificial violet (1 in 100) ("new violet" or ionone)	7 l. 350 c.c.
.. artificial essence of orris (1 in 50)	3 l. 675 "
.. cassie	1 l. 225 "
.. vanillin	600 c.c.
Infusion of benzoin	100 grams
Tincture of musk	50 "

Violet Perfume III

Infusion of orris root	1 l. 225 c.c.
Tincture of jasmine	50 grams
.. mignonette	50 "
.. cassie	100 "
Rose water	100 "
Alcohol, 95 per cent.	150 "
Ionone	10 "
Lin. Jol	5 "
Ionarol (proprietary violet, artificial)	1 gram
Tincture of artificial musk	5 grams
.. .. civet	1 gram

Appended are some formulæ of extracts recently invented.

Safranor

Infusion of jasmine, I	4 l. 900 c.c.
.. rose, I	3 l. 700 "
.. orris, I	1 l. 225 "
.. "mousse de chêne"	1 l. 200 "
.. natural musk	100 grams

Heliotropin	200 grams
Bourbonal (proprietary, vanilla odour)	20 "
Coumarin	5 "
isoEugenol	10 "
Oil of bergamot	15 "
„ patchouli	40 "
„ rose, synthetic	80 "

“Essetce de Moscarl”

Infusion of rose, I	1 l. 225 c.c.
„ orange, I	2 l. 450 „
„ cassie, I	620 c.c.
„ musk	1 l. 225 c.c.
„ civet	400 c.c.
Artificial musk	30 grams
Tincture of jasmine	2 l. 450 c.c.
Infusion of benzoin	250 c.c.
„ „mousse de chêne”	620 „
Oil of rosewood	15 grams

“Xylopiu”

Infusion of jasmine	6 l. 125 c.c.
„ rose, I	2 l. 450 „
Tincture of vanillin	2 l. 450 „
Infusio. of orange, I	3 l. 750 „
Essence of synthetic cassie	30 grams
Infusion of musk	100 „
Oil of bergamot	80 „
„ vetiver	10 „
Coumarin	3 „
Infusion of balsam of tolu	250 „

Japanese “Ki-Loc”

Infusion of tuberose, I	1 l. 225 c.c.
„ rose, I	2 l. 450 „
„ jasmine, I	2 l. 450 „
„ orris	3 l. 675 „
„ musk	625 c.c.
„ labdanum	225 „
Oil of rose	18 grams
Heliotropin	70 „
Oil of ylang-ylang	10 „
Irolene (proprietary, neroli odour)	5 „
Oil of bergamot	40 „
Vanillin	25 „
Ionone	5 „

Japanese Lily

Infusion of cassie, I	2 l. 750 c.c.
„ rose, I	2 l. 750 „
„ jonquil	1 l. 125 „
„ tuberose	150 grams
„ musk	500 c.c.
Oil of geranium	45 grams
„ sweet orange	5 „
Vanillin	10 „
Ionone	5 „
Hyacinth	3 „

DOUBLE EXTRACTS

177

Remembrance

Infusion of jasmine, I	2 l. 450 c.c.
„ „ rose, II	4 l. 900 „
<i>iso</i> Eugenol	20 grams
Vanillin	5 „
Oil of bergamot ..	45 „
Linalol	20 „
Infusion of musk	50 „
„ storax	100 „
Oil of neroli (artificial)	5 „
Synthetic glycine (proprietary)	10 „

DOUBLE EXTRACTS

• SECOND SERIES

Double extracts have a cheaper market than triple or quadruple ones. Their perfume is less concentrated and less intense, although quite as fine. To prepare double extracts and single extracts, it is sufficient to dilute triple extracts by adding water and alcohol in the following proportions. To prepare double extracts, take :—

Triple extract	7 l. 250 c.c.
and add to this	
Alcohol ..	4 l. 300 c.c.
Water ..	600 c.c.

To prepare single extracts, take :—

Triple extract	4 l. 900 c.c.
and add to this	
Alcohol	4 l. 900 c.c.
Water ..	2 l. 450 „

This method, however, does not give satisfactory results in all cases, as public taste is accustomed to the stronger perfumes. Appended is a series of formulæ of single and double extracts. To prepare these products, good use can be made of pomade infusions II and III, but usually it is preferable to take synthetics and to dissolve them in alcohol. The following are for double extracts :—

Violet

Alcohol	7 l. 350 c.c.
Ionone	8 grams
Tincture of synthetic jasmine	250 „
Infusion of benzoin	250 „
Synthetic ylang-ylang	10 „
Tincture of artificial musk	100 „
Distilled water	3 l. 600 c.c.

Wood Violets

Tincture of synthetic cassie, II	1 l. 225 c.c.
" " fresh violets, II	1 l. 850 "
" " jasmine, II	1 l. 225 "
Infusion of rose, II	1 l. 225 "
Oil of Réunion geranium	20 grams
Ionone	100 "
Tincture of vanillin, 10 per cent.	100 "
" ambrettol	200 "
" synthetic orris	3 l. 675 c.c.
Alcohol	2 l. 575 "

White Heliotrope

Alcohol	7 l. 350 c.c.
Heliotropin (heliotropin)	120 grams
Vanillin	30 "
Tincture of synthetic jasmine	200 "
Infusion of benzoin	280 "
Tincture of artificial musk	120 "
Water	3 l. 500 c.c.

Another Formula

Alcohol	2 l. 450 c.c.
Infusion of jasmine, II	1 l. 225 "
" rose, II	1 l. 225 "
" tuberose, II	490 c.c.
" orange, II	490 "
Tincture of synthetic civet	150 grams
Heliotropin	60 "
Commurin	10 "
Vanillin	5 "

White Lilac

Alcohol	6 l. 500 c.c.
Synthetic lily of the valley	40 grams
Terpineol	200 "
Tincture of artificial musk	100 "
" synthetic jasmine	350 "
Infusion of benzoin	400 c.c.
Water	3 l. 500 c.c.

Another Formula

Alcohol	4 litres
Tincture of synthetic jasmine	750 c.c.
Extract of rose (double)	750 "
Infusion of civet	10 grams
Terpineol	150 "
Heliotropin	7 "
Synthetic ylang-ylang	16 "

Lily of the Valley

Alcohol	7 l. 350 c.c.
Tincture of heliotropin	240 grams
" synthetic jasmine	300 "
" artificial musk	100 "
Infusion of benzoin	300 "

DOUBLE EXTRACTS

179

Synthetic ylang-ylang	10 grams
„ neroli	3 „
„ lily of the valley	50 „
Oil of linaloe	50 „
Water	3 l. 500 c.c.

English Honey

Alcohol	3 litres
Infusion of jasmine, II	1 l. 225 c.c.
„ tuberose, II	1 l. 225 „
„ orris	710 c.c.
„ Siamese benzoin	125 grams
„ musk, I	20 „
„ labdanum	30 „
„ civet	20 „
Vanillin	3 „
Eugenol	10 „
Orgeol (proprietary, rose odour)	10 „
Mandarin oil	20 „

Rose

Alcohol	7 l. 350 c.c.
Oil of rose (synthetic)	25 grams
„ patchouli	3 „
„ bergamot	10 „
„ linaloe	5 „
Infusion of benzoin	100 „
Water	1 l. 500 c.c.

Opopanax

Alcohol	7 l. 350 c.c.
Liquid oil of orris	50 grams
Oil of bergamot	25 „
„ rose (synthetic)	5 „
Tincture of artificial civet	50 „
Hyacinth	50 „
Infusion of benzoin	30 „
Geraniol	5 „
isoEugenol	10 „
Vanillin	40 „
Oil of sweet orange	20 „
Water	1 l. 500 c.c.

Another Formula

Infusion of rose, II	1 l. 225 c.c.
„ orange, II	1 l. 225 „
„ violet, II	1 l. 225 „
„ orris	600 c.c.
„ storax	50 grams
„ Siamese benzoin	400 „
Tincture of artificial musk	50 „
Vanillin	2 „
Coumarin	3 „
Oil of lemon	25 „
„ bergamot	40 „
„ opopanax	10 „
„ Algerian geranium	15 „
Alcohol	1 l. 250 c.c.

Ess Bouquet

Alcohol	7 l. 350 c.c.
Oil of orris (synthetic)	40 grams
" bergamot	50 "
Tincture of artificial civet	50 "
Oil of rose (synthetic)	5 "
Ambrettol	3 "
Oil of jasmine (artificial)	10 "
Coumarin	10 "
Liquid aubepine	5 "
Geraniol	5 "
Water	1 l. 500 c.c.

" Patchouli

Alcohol	7 l. 350 c.c.
Oil of patchouli	30 grams
" vetivert	5 "
" geranium	15 "
Infusion of storax	100 "
Tincture of artificial civet	100 "
Water	1 l. 500 c.c.

Musk

Tincture of artificial musk	7 l. 350 c.c.
" " civet	500 c.c.
Linalol	5 grams
Oil of patchouli	5 "
Geraniol	3 "
Infusion of tolu	100 "
Water	1 l. 500 c.c.
Alcohol	1 l. 850 "

Another Formula

Infusion of orange, II	1 l. 850 c.c.
" rose, II	2 l. 150 "
" ambrette seeds	1 l. 850 "
Tincture of artificial musk	350 grams
" " civet	150 "
Oil of French geranium	10 "
Alcohol	300 "

Hyacinth

Alcohol	7 l. 350 c.c.
Terpineol	40 grams
Benzyl acetate	5 "
Hyacinth (artificial)	30 "
Agfa fixative	20 "
Heliotropin	30 "
Water	1 l. 500 c.c.

New-mown Hay

Tincture of synthetic orange, II	1 l. 480 c.c.
" " rose, II	2 l. 450 "
" " jasmine, II	1 l. 480 "
Oil of Spanish geranium	12 grams
" rose (synthetic)	3 "
Coumarin	50 "
Vanillin	2 "
Infusion of musk	50 "
Anisic aldehyde	4 "
Alcohol	600 "

SINGLE EXTRACTS AND PERFUMED WATERS 181

Ylang-Ylang

Alcohol	7 l. 350 c.c.
Oil of ylang-ylang (synthetic)	40 grams
„ Javan cananga	30 „
Vanillin	2 „
Oil of neroli (synthetic)	10 „
Infusion of rose, II	600 c.c.
„ jasmine, II	600 „
„ civet	150 grams
Orgeol	15 „

SECOND SERIES (cont.)

SINGLE EXTRACTS AND PERFUMED WATERS

Lilac

Alcohol, 80 per cent.	1 l. 300 c.c.
Oil of neroli (synthetic)	1 gram
„ rose (synthetic)	1 „
„ bergamot	1 „
„ jasmine (synthetic)	4 grams
Terpineol	25 „
Infusion of balsam of tolu	10 „
Tincture of artificial civet	5 „
Alcoholic solution of bitter almonds (1 per cent.)	5 „
Vanillin	75 c.c.

Heliotrope

Alcohol, 80 per cent.	1 l. 300 c.c.
Heliotropin	0.5 gram
Coumarin	1 „
Oil of geranium	0.5 „
„ ylang-ylang (synthetic)	1 „
„ jasmine (synthetic)	3 grams
Alcoholic solution of bitter almonds (1 per cent.)	25 „
Tincture of artificial civet	3 „
„ „ musk	3 „
Oil of neroli (synthetic)	1 gram

Hyacinth

Alcohol, 80 per cent.	1 l. 300 c.c.
Hyacinth (artificial)	3 grams
Synthetic jasmine	2 „
„ ylang-ylang	0.5 gram
Oil of neroli (synthetic)	0.5 „
„ geranium	1 „
„ sweet orange	2 grams
Triple extract of patchouli	5 „

Jasmine

Alcohol, 80 per cent.	1 l. 300 c.c.
Oil of jasmine (synthetic)	8 grams
„ neroli (synthetic)	1 gram
Alcoholic essence of lemon (5 per cent.)	10 grams

Lily of the Valley

Alcohol, 80 per cent.	1 l. 300 c.c.
Linalol	6 grams
Oil of neroli (synthetic)	0.5 gram
Infusion of balsam of tolu	4 grams
Synthetic jasmine	2 "
Tincture of artificial musk	3 "
Ammonia (0.960)	5 drops

Mignonette

Alcohol, 80 per cent.	1 l. 300 c.c.
Oil of geranium	2 grams
" neroli (synthetic)	2 "
Synthetic jasmine	2 "
Infusion of balsam of tolu	20 "
Oil of sweet orange	1 gram

Violet

Infusion of violet, III	4 l. 900 c.c.
" rose, II	2 l. 450 "
Tincture of violet, III (synthetic)	4 litres
" coumarin	100 grams
Alcoholic solution of liquid essence of orris	100 "
Ionone	5 "
Infusion of benzoin	50 "
" musk, I	50 "
Orgeol (proprietary, rose odour)	2 "

Ess. Bouquet

Alcohol, 90 per cent.	6 litres
Oil of bergamot	35 grams
" lavender	4 "
" cloves	4 "
Citral	10 "
Synthetic neroli	4 "
Oil of rosemary	4 "
" cinnamon	4 "
" cedarwood	4 "
" rose (synthetic)	2 "
" cardamom	1 gram
Tincture of artificial musk	10 grams

"Mille-Fleurs"

Alcohol, 90 per cent.	6 l. 125 c.c.
Oil of bergamot	8 grams
" lavender	12 "
" cloves	12 "
" neroli (synthetic)	12 "
Cinnamicin	20 "
Tincture of artificial musk	20 "
Agfa fixative	5 "

Apopanax

Alcohol, 90 per cent.	6 l. 125 c.c.
Oil of lemon-grass	90 grams
Geraniol	24 "
Oil of cloves	12 "
" neroli (synthetic)	2 "
Rose-water	1 l. 500 c.c.

SINGLE EXTRACTS AND PERFUMED WATERS 183

Ylang-Ylang

Alcohol, 90 per cent.	3 l. 675 c.c.
Oil of bergamot	50 grams
„ ylang-ylang (synthetic)	50 „
Tincture of orris (synthetic)	500 „
„ artificial musk	10 „
Essence of linaloe	15 „
Hyacinth (artificial)	3 „

Rose

Alcohol, 90 per cent.	4 l. 900 c.c.
Distilled water	2 l. 450 „
Oil of bergamot	7 grams
„ geranium	50 „
„ synthetic rose	50 „
„ sandalwood	2 „
Orgeol (proprietary, rose odour)	5 „

San Remo Violet

Tincture of synthetic cassie	600 c.c.
„ „ violet	1 l. 225 c.c.
„ „ jasmine	500 grams
„ „ rose	500 „
Oil of Réunion geranium	50 „
„ bergamot	50 „
Ionone	50 „
Tincture of vanillin, 10 per cent.	50 „
„ ambrettol	500 „
„ synthetic orris	4 l. 900 c.c.
Alcohol	3 l. 420 „

Colour with chlorophyll.

Perfumed New-mown Hay

Alcohol	4 l. 900 c.c.
Coumarin	20 grams
Tincture of synthetic orange, I	200 „
Oil of Spanish geranium	10 „
Tincture of synthetic rose, I	300 „
„ „ jasmine, I	100 „
„ artificial musk	10 „
Anisic aldehyde	5 „
Rose-water	600 c.c.

New-mown Hay (single)

Alcohol	3 litres
Coumarin	40 grams
Oil of Spanish geranium	20 „
Vanillin	1 gram
Tincture of synthetic orange, II	400 grams
„ „ rose, II	600 „
„ „ jasmine, II	200 „
„ artificial musk	20 „
Anisic aldehyde	5 „
Orange-flower water	500 c.c.

Ylang-Ylang (Single)

Alcohol	5 litres
Oil of Javan cananga	40 grams
„ ylang-ylang (synthetic)	20 „
Linalol	15 „
Oil of neroli (synthetic)	5 „
„ Spanish geranium	15 „
Tincture of synthetic jasmine, III	1 l. 500 c.c.
„ artificial civet	200 grams
Distilled water	500 c.c.

Ylang-Ylang

Alcohol	5 l. 200 c.c.
Tincture of synthetic jasmine	1 l. 200 „
„ ambrettol	200 grams
„ artificial musk	10 „
Oil of Javan cananga	12 „
„ ylang-ylang (synthetic)	3 „
„ neroli (synthetic)	5 „

Musk (Single)

Alcohol	6 l. 125 c.c.
Tincture of ambrettol	1 l. 225 „
„ artificial musk	200 grams
Infusion of tolu	500 „
Oil of Algerian geranium	15 „
„ bergamot	40 „
Orgeol (proprietary, rose odour)	20 „

Sweet Musk

Alcohol	5 litres
Tincture of ambrettol	1 l. 500 c.c.
„ artificial musk	600 c.c.
Infusion of tolu	600 „
Oil of Algerian geranium	10 grams
„ bergamot	30 „
„ rose (synthetic)	10 „
Rose-water	500 „

Sweet Opopanax

Alcohol	4 l. 300 c.c.
Tincture of synthetic jasmine, III	1 l. 225 „
Essence of opopanax	10 grams
Methylbenzoic ether	5 „
Infusion of storax	150 „
„ tolu	150 „
„ orris	450 c.c.

Patchouli (Single)

Alcohol	4 l. 300 c.c.
Oil of patchouli	20 grams
„ Algerian geranium	35 „
„ sandalwood	30 „
Infusion of storax	200 „
Tincture of artificial musk	250 „
„ „ civet	150 „
Distilled water	500 c.c.

SINGLE EXTRACTS AND PERFUMED WATERS 185

Sweet Patchouli

Alcohol	5 litres
Oil of patchouli	25 grams
„ Algerian geranium	20 „
Tincture of artificial musk	500 „
Distilled water	500 c.c.

Lilac (Single)

Alcohol	4 litres
Terpineol	100 grams
Heliotropin	5 „
Oil of cananga	20 „
Tincture of synthetic jasmine, III	750 „
„ „ rose, III	500 „
„ ambrettol	200 „

Sweet Lilac

Alcohol	4 litres
Terpineol	50 grams
Heliotropin	2 „
Oil of cananga	8 „
Coumarin	1 gram
Tincture of synthetic rose, III	250 grams
„ „ jasmine, III	500 „
Lemon oil	5 „
Oil of bergamot	5 „
Tincture of ambrettol	250 „
Infusion of storax	200 „
Distilled water	500 c.c.

Heliotrope

Alcohol	4 l. 650 c.c.
Heliotropin	25 grams
Coumarin	5 „
Vanillin	0.5 gram
Tincture of synthetic jasmine, I	400 grams
„ „ rose, I	400 „
„ „ tuberose, I	160 „
„ „ orange, I	160 „
„ artificial civet	60 „

Sweet Heliotrope

Alcohol	5 l. 325 c.c.
Heliotropin	15 grams
Coumarin	3 „
Vanillin	1 gram
Balsam of Peru	30 grams
Tincture of synthetic rose, I	250 „
„ „ jasmine, I	250 „
„ „ tuberose, I	100 „
Oil of sweet orange	2 „
Tincture of artificial civet	50 „

Sweet Lily of the Valley

Alcohol	1 l. 250 c.c.
Essence of linaloe	100 grams
Tincture of synthetic cassie, III ..	500 "
" " orange, III ..	500 "
" " jasmine, III ..	500 "
" vanillin (2 per cent.)	10 "
" chlorophyll (1 in 20) ..	50 "
Distilled water	500 "

EXTRACTS FOR EXPORT

Good quality extracts for export can be made by taking as bases compositions of essential oils and solutions of gum-resins, which are diluted further with water and alcohol. In this way, extremely concentrated products are obtained, highly scented and which keep well; further, the manufacture is considerably simplified, and whatever strength solution may be desired is easily obtained. The following are specimen formulæ of this nature.

Rose

Alcohol	12 l. 250 c.c.
Eugenol	30 grams
Oil of geranium	350 "
" bergamot	50 "
Tincture of artificial musk	100 "
" " civet ..	100 "
Infusion of storax	350 "
" tolu	300 "
" orris	600 "

Bergamot

Alcohol	12 l. 250 c.c.
Bergamot oil	400 grams
Infusion of benzoin	600 "
" storax	100 "
" orris	500 "
Tincture of artificial civet	100 "
" " musk	100 "

Lilac

Alcohol	12 l. 250 c.c.
Infusion of orris	500 grams
" storax	300 "
" benzoin	200 "
Tincture of artificial musk	150 "
" " civet	50 "
Coumarin	40 "
Terpincol	250 "
Synthetic muguet	30 "

• *Colonial Bouquet*

Alcohol	12 l. 250 c.c.
Infusion of tolu	300 grams
„ benzoin	250 „
„ storax	250 „
Coumarin	40 „
Tincture of artificial musk	100 „
„ „ civet	100 „
Oil of sandalwood	20 „
Linalol	30 „
Oil of bergamot	150 „
Citral	7 „
Liquid oil of orris	15 „
Eugenol	5 „
Lemon oil	50 „

• *Chypre*

Alcohol	12 l. 250 c.c.
Infusion of balsam of tolu	300 grams
„ balsam of Peru	300 „
„ storax	300 „
Tincture of artificial musk	100 „
Turanol	10 „
Solution of oil of orris	150 „
„ „ vetiver	100 „
Oil of wintergreen	5 „
Anisepine	20 „
Oil of bergamot	100 „
Citral	5 „
Lemon oil	100 „
Benzyl acetate	5 „
Oil of geranium	50 „
„ lavender	20 „
Eugenol	5 „
Oil of cedarwood	30 „

• *Heliotrope*

Alcohol	12 l. 250 c.c.
Infusion of benzoin	400 grams
Tincture of artificial musk	100 „
Oil of bergamot	180 „
Terpineol	30 „
Heliotropin	80 „
Vanillin	30 „
Coumarin	20 „
Agla fixative	50 „

• *Mousseline*

Alcohol	12 l. 250 c.c.
Oil of verbena	180 grams
„ „ artificial wintergreen	60 „
„ „ cassie (artificial)	60 „
Eugenol	15 „
Linalyl acetate	30 „
Oil of bergamot	100 „
Tincture of artificial musk	100 „
„ „ civet	100 „
Infusion of tolu	250 „
„ benzoin	300 „
Nerolin	15 „

Gardenia

Alcohol	12 l. 250 c.c.
Infusion of tolu	300 grams
" benzoin	250 "
" balsam of tolu	200 "
Tincture of artificial musk	100 "
" " civet	100 "
Oil of bergamot	150 "
" lemon	50 "
Citral	5 "
Bromelia	50 "
Oil of sandalwood	25 "
Heliotropin	10 "

Patchouli

Alcohol	12 l. 250 c.c.
Infusion of orris	350 grams
" storax	300 "
" benzoin	350 "
Tincture of artificial musk	200 "
" " civet	200 "
Coumarin	30 "
Oil of patchouli	300 "

HIGHLY CONCENTRATED EXTRACTS FOR EXPORT

Javan Bouquet

Alcohol	13 l. 250 c.c.
Oil of geranium	40 grams
" verbena	100 "
" bergamot	65 "
Citral	5 "
Oil of sweet orange	50 "
Eugenol	25 "
Balsam of Peru	25 "
Infusion of labdanum	50 "
Tincture of artificial musk	75 "
Infusion of jasmine, II	1000 "
Distilled water	5 l. 500 c.c.

Bouquet West End

Alcohol	13 l. 500 c.c.
Geraniol	100 grams
Oil of bergamot	30 "
Tincture of artificial civet	125 "
" " musk	50 "
Coumarin	10 "
Infusion of benzoin	100 "
Distilled water	5 l. 500 c.c.

Flower of India

Alcohol	13 l. 500 c.c.
Essence of Algerian geranium	25 grams
Eugenol	20 "
Oil of bergamot	75 "
Linalol	50 "
Coumarin	6 "
Heliotropin	6 "
Essence of syringa	50 "
Tincture of ambrettol	175 "
Distilled water	5 l. 500 c.c.

Flowers of Africa

Alcohol	13 l. 500 c.c.
Oil of lavender	100 grams
Eugenol	45 "
Oil of bergamot	50 "
Turanol	5 "
Linalyl acetate	20 "
Geraniol	40 "
Infusion of benzoin	200 "
Tincture of ambrettol	200 "
Distilled water	5 l. 500 c.c.

Bouquet Yaddo

Alcohol	13 l. 500 c.c.
Oil of geranium	100 grams
.. bergamot	25 "
.. sandalwood	5 "
.. linaloe	25 "
isoSafrol	20 "
Tincture of ambrettol	30 "
.. vanillin	50 "
.. coumarin	50 "
Distilled water	5 l. 500 c.c.

CONCENTRATED PERFUMES WITHOUT ALCOHOL

Concentrated perfumes without alcohol are usually prepared with essences of flowers, suitably diluted and with various products added in order to refine them to some extent. The most appropriate solvents for diluting flower essences (instead of alcohol) are benzyl benzoate, benzyl alcohol, and cinnamine, but they should be used with discretion, for, after the evaporation of the so-called perfume, a rather unpleasant strong residual odour will be left. Benzyl benzoate in particular should be pure. Terpineol forms an equally good solvent if of good quality and if its odour is permissible. As the odour mingles very well with the majority of perfumes without causing too much alteration

in the bouquet, it can be used to advantage in this capacity. On the other hand, if it is desired to add a little musk as fixative to certain preparations, artificial musk should be used dissolved in one or other of the above-mentioned solvents. Care must be taken to warm these liquids when utilising them as solvents. Certain such formulæ are appended.

" Otto " of Rose

Taken in its proper sense, the name designates pure essential oil of rose. In practice, it is often used outside Europe to designate a product which is much employed to perfume fatty oils for anointing and massage as a preventative of perspiration, and its principal constituent is oil of geranium, to which are added other perfumes of the rose class. This is, of course, the outcome of Oriental sophistication. For example :—

I. Oil of geranium	400 grams
Orgeol	100 ..
Oil of palmarosa	500 ..
II. Oil of geranium	500 grams
„ rose (artificial)	20 ..
„ palmarosa	1000 ..
White petroleum oil	500 ..

More common varieties are equally in demand; they are diluted with alcohol and sold as extracts.

Extract of Otto of Rose

I. Alcohol	1000 grams
Oil of geranium	400 ..
Orgeol	20 ..
II. Alcohol	1500 grams
Oil of palmarosa	200 ..
Orgeol	20 ..
Oil of geranium	100 ..

This extract is coloured yellow or green, according to the demand. Fine yellow is the most popular colour. Appended are formulæ for perfumes which are concentrated without alcohol.

Acacia

Artificial essence of acacia	100 grams
Terpincol	50 ..
Artificial musk	3 ..

Azalea

Essence of azalea	500 grams
Adinol (fixative)	200 ..
Artificial musk	5 ..
Vanillin	3 ..

CONCENTRATED PERFUMES

191

Cassia

Essence of cassia	500 grams
Eufixine (fixative)	900 ..
Artificial musk	20 ..
Terpincol	40 ..

Champaca

Essence of champaca	500 grams
Terpincol	350 ..
Artificial musk	10 ..

Cyclamen

Essence of cyclamen	100 grams
Terpincol	50 ..
Essence of rose	3 ..

Honeysuckle

Essence of honeysuckle	500 grams
Terpincol	350 ..
Artificial musk	5 ..
Vanillin	1 gram

Gardenia

Essence of gardenia	100 grams
.. rose	5 ..
Terpincol	40 ..

Glycine

Glycine	500 grams
Terpincol	225 ..
Artificial musk	5 ..

Heliotrope

Liquid essence of heliotrope	250 grams
Eufixine	1000 ..
Vanillin	15 ..
Oil of rose	2 ..
.. cassia	0.5 gr.

Hyacinth

Hyacinth (artificial)	100 grams
Terpincol	150 ..
Oil of rose	5 ..
Artificial heliotrope	10 ..

Jasmine

Essence of jasmine	100 grams
Artificial musk	3 ..
Oil of rose	2 ..

Jonquil

Essence of jonquil	100 grams
Terpincol	20 ..
Oil of jasmine	3 ..
.. neroli	2 ..
Artificial musk	2 ..

Orris

Liquid oil of orris	100 grams
Terpineol	50 "
Artificial musk	3 "
Otto of rose	2 "

Lily of the Valley

Essence of lily of the valley	100 grams
Linalol	20 "
Terpineol	80 "
Artificial musk	4 "

Mimosa

Essence of mimosa	100 grams
Artificial musk	3 "
Otto of rose	3 "

Narcissus

Essence of narcissus	100 grams
Otto of rose	5 "
Artificial musk	3 "

Neroli

Essence of neroli	500 grams
Enfixine	225 "
Artificial musk	8 "
Otto of rose	5 "

Orange

Essence of neroli	100 grams
Terpineol	30 "
Otto of rose	3 "
Artificial musk	5 "

Patchouli

Essence of patchouli	100 grams
Terpineol	50 "
Otto of rose	10 "
Oil of sandalwood	20 "

Mignonette

Essence of mignonette	100 grams
Terpineol	30 "
Artificial musk	5 "

Rose

Otto of rose	100 grams
" geranium	30 "
Artificial musk	3 "

Santal

Sandalwood oil	100 grams
Terpineol	30 "
Artificial musk	5 "
Otto of rose	3 "

Syringa

Essence of syringa	100 grams
Terpineol	40 "
Liquid hawthorn	5 "
Artificial musk	5 "
Réuniol	5 "

Clower

Essence of orchid	100 grams
Terpineol	20 "
Artificial musk	3 "
Réuniol	5 "

Tuberose

Essence of tuberose	100 grams
Terpineol	30 "
Artificial musk	3 "

Violet I

Essence of violet	100 grams
Terpineol	30 "
Artificial musk	3 "

Violet II

Ionone, 100 per cent.	100 grams
Terpineol	300 "
Artificial musk	6 "

Ylang-Ylang

Essence of ylang-ylang	100 grams
Terpineol	30 "
Liquid essence of orris	5 "
Oil of jasmine	10 "
" rose	5 "

Artificial musk is dissolved in terpeneol where indicated; benzy¹ benzoate may equally well be used, and equivalent quantities of the solvent should be taken.

The method of using concentrated perfumes without alcohol obviously differs to some extent from that of extracts. Ladies use them to perfume their wardrobe by means of small pads of wadding on which a few drops of the concentrated essence are poured. If it is desired to use them to perfume the handkerchief, it is sufficient to add a little alcohol to a few drops of the essence. Concentrated perfumes are sold in small stoppered glass bottles containing from 1 to 10 grams.



CHAPTER V

TOILET WATERS

TOILET waters are nothing more than alcoholic extracts specially prepared with a view to their use as skin preparations, scalp cures, for the hair, the teeth, the gums, and the mouth. Therefore it is necessary to guard against all substances which may be harmful in regard to the particular purpose they are made for.

There is a prejudice in some quarters against their use, which we shall attempt to dispel, although we are under no illusion on the matter. Most consumers agree that the more milky appearance a toilet water produces when poured into ordinary water, the better it is. The milky appearance so produced arises from the insolubility of nearly all the aromatic essences in water, and certain of these essences, especially those derived from resinous material such as benzoin and storax, produce far more precipitate with water than the finest essences of rose or orris, for example. These copious precipitates often merely impede the beneficial action of the toilet water, and it is clear that those that only give a light opalescence with water (eau de Cologne, lavender water, etc.) are the best waters. They do not obstruct the pores of the skin and the beneficial result of the water containing a little alcohol is not impeded by a resinous deposit.

Toilet waters have, usually, a less alcohol content than handkerchief perfumes. The finest do not exceed 80 per cent., and often they only contain 30 per cent.

FORMULÆ FOR TOILET WATERS

PART I.—OLDER FORMULÆ

Lavender Water No. 1

Alcohol, 95 per cent.	50 litres
Infusion of storax,	2 "
" orris, I	6 "
" ambrette seeds, I	6 "
" orange, I	6 "
" vanilla, II	26 "
" vanilla, I	800 grams
" musk, I	80 "
" civet	80 "
" ambergris	160 "

TOILET WATERS

195

Lavender oil (French)	560 grams
Lemon oil	80 "
Bergamot oil	80 "
Orange oil	80 "
Neroli oil	16 "

Allow to stand for eight days and then reduce to 80 per cent. alcoholic strength.

Lavender Water—"Ambrée"

Alcohol, 95 per cent.	24 litres
Infusion of lavender, II	5 "
" " lavender, I	3 "
Oil of bergamot	102 grams
" " lavender (French)	200 "
Infusion of musk-pods, I	200 "
" " civet, I	200 "

Reduce to 70 per cent. alcoholic strength with distilled water.

Lavender Water No. 3

Alcohol	37 l. 5 c.c.
Infusion of lavender, II	5 litres
" " lavender, I	3 "
Oil of lavender	900 grams
" " bergamot	150 "
Infusion of musk-pods, II	18 "
" " civet, I	20 "
Oil of spike	150 "
Infusion of sandalwood	250 "

Reduce to 60 per cent. strength with distilled water.

English Lavender Water No. 4

Alcohol, 32 per cent.	4 litres
Infusion of orris	60 grams
" " Tonquin beans	60 "
Oil of lavender (English)	40 "
" " bergamot	24 "
Infusion of musk	6 "

Toilet Water—Lubin Type

Alcohol, 90 per cent.	2 litres
Infusion of orange, II	200 grams
" " ambrette seeds, I	300 "
" " orange, I	150 "
" " Tonquin bean, I	100 "
" " musk-pod, I	350 "
" " tuberose, I	100 "
" " storax	50 "
" " benzoin, I	50 "
" " vanilla, I	30 "
Orange oil	10 "
Bergamot oil	4 "
Neroli oil	1 gram
Infusion of musk, I	4 grams
" " civet, I	3 "
" " castor, I	1 gram

Reduce to 80 per cent. alcoholic strength with orange-flower water.

Toilet Water- Lubin Type (Tobutine de Rigaud)

Alcohol, 95 per cent.	20 litres
Extract of orris	10 "
Infusion of balsam of tolu, I	3-5 "
Tincture of musk	100 grams
Bouquet mousseline	100 "
Oil of lavender	150 "
„ bergamot	100 "
„ cloves	10 "
„ ylang-ylang	5 "

Reduce to 80 per cent. alcoholic strength with water.

Rose Toilet Water

Alcohol	5 l. 550 c.c
Infusion of rose, I	1 litre
„ „ rose, II	250 grams
Extract of rose, I	1 l. 500 c.c
Infusion of benzoin, I	800 grams
„ civet, I	100 "
Essence of rose, II	5 "

Reduce to 80 per cent. alcoholic strength with rose-water.

English Honey Toilet Water

Infusion of jasmine, II	1 l. 600 c.c.
„ tuberose, I	1 l. 230 "
„ orris, I	820 grams
„ „ vanilla, I	205 "
„ ambergris, I	615 "
„ musk-pod, I	310 "
„ vanillin, I	615 "
„ storax, I	1 l. 600 c.c
„ mace, I	10 grams
„ wallflower, I	50 "
„ balsam of tolu, I	50 "
„ benzoin, I	410 "
Oil of rose	15 "
„ cloves	11 "
„ neroli	22 "
„ bergamot	43 "
„ lemon	22 "

Reduce to 80 per cent. with distilled water.

Ylang-Ylang

Alcohol	6 l. 460 c.
Infusion of orris, I	500 grams
„ „ jasmine, II	500 grams
„ tuberose, II	560 "
„ benzoin, II	365 "
Oil of ylang-ylang	50 "
„ bergamot	20 "
„ wintergreen	2 "
Infusion of musk-pod	30 "
„ „ civet, I	15 "
„ „ storax, I	5 "

Reduce to 80 per cent. with distilled water.

Lavender oil (French)	560 grams
Lemon oil	80 "
Bergamot oil	80 "
Orange oil	80 "
Neroli oil	16 "

Allow to stand for eight days and then reduce to 80 per cent. alcoholic strength.

Lavender Water—"Ambrée"

Alcohol, 95 per cent.	24 litres
Infusion of lavender, II	5 "
" lavender, I	3 "
Oil of bergamot	102 grams
" lavender (French)	200 "
Infusion of musk-pods, I	200 "
" civet, I	200 "

Reduce to 70 per cent. alcoholic strength with distilled water.

Lavender Water No. 3

Alcohol	37 l. 5 c.c.
Infusion of lavender, II	5 litres
" lavender, I	3 "
Oil of lavender	900 grams
" bergamot	150 "
Infusion of musk-pods, II	18 "
" civet, I	20 "
Oil of spike	150 "
Infusion of sandalwood	250 "

Reduce to 60 per cent. strength with distilled water.

English Lavender Water No. 4

Alcohol, 32 per cent.	4 litres
Infusion of orris	60 grams
" Tonquin beans	60 "
Oil of lavender (English)	40 "
" bergamot	24 "
Infusion of musk	6 "

Toilet Water—Lubin Type

Alcohol, 95 per cent.	2 litres
Infusion of orange, II	200 grams
" ambrette seeds, I	300 "
" orange, I	150 "
" Tonquin bean, I	100 "
" musk-pod, I	350 "
" tuberose, I	100 "
" storax	50 "
" benzoin, I	50 "
" vanilla, I	30 "
Orange oil	10 "
Bergamot oil	4 "
Neroli oil	1 gram
Infusion of musk, I	4 grams
" civet, I	3 "
" castor, I	1 gram

Reduce to 80 per cent. alcoholic strength with orange-flower water.

Vanilla Water

Alcohol, 95 per cent.	4 litres
Infusion of benzoin	1 litre
Water	1 "
Infusion of vanilla	25 grams

Reduce to 80 per cent. with distilled water.

Bouquet Water

Alcohol, 95 per cent.	3 litres
Alcoholic infusion of orris	250 c.c.
Infusion of tolu	250 "
" benzoin ..	250 "
Oil of bergamot.....	10 grams

Reduce to 80 per cent. with rose-water.

Second Series

FORMULÆ FOR TOILET WATERS CONTAINING SYNTHETIC
PERFUMES.

Violet Toilet Water

Alcohol	17 l. 150 c.c.
Solution of orris	400 grams
Tincture of vanillin	125 "
Ionone	50 "
Infusion of musk	50 "
" orris	2 l. 500 c.c.
Orange-flower water	4 litres
Distilled water	4 "

San Remo Violet Toilet Water

Alcohol	7 l. 500 c.c.
Tincture of synthetic violet, I	600 c.c.
" vanillin	150 grams
Oil of geraniun	10 "
Liquid oil of orris	85 "
Artificial oil of ylang-ylang.	5 "
Tincture of musk	100 "
Water	2 litres

Colour green.

Heliotrope Toilet Water

Tincture of heliotropin	6 l. 125 c.c.
Oil of jasmine (artificial)	10 grams
Vanillin	20 "
Water	2 litres

Rose Toilet Water

Tincture of synthetic rose, II	6 l. 125 c.c.
Phenyl ethyl alcohol	15 grams
Water	2 litres

Jasmine Toilet Water

Tincture of synthetic jasmine. I	1 l. 850 c.c.
" heliotropin	1 l. 225 "
" artificial musk	1 litre
Aubepine	10 grams
Terpineol	20 "
Linalyl acetate	10 "
Alcohol	4 l. 500 c.c.
Water	2 l. 500 c.c.

In the preceding formulæ in every case it is as well to add about 50 grams of borax, the beneficial action of which on the skin is well known.

Inhabitants of warm climates use toilet waters more than other people, and it is in such places that the best market for the products of the perfumery trade is found.

The toilet waters in chief demand in France are Florida water, Cananga water, "Peau divine," toilet vinegar, Cologne water, lavender water, orange water, and Felsina water, the last named being an Italian product.

The majority of exported toilet waters are English or American, but before the war they were chiefly made in Germany. Florida water is largely exported from the United States to Central and South America, China, and Japan. The last-named country demands goods of a most carefully chosen quality.

The following formulæ are for toilet waters for exportation.

Florida Water

Alcohol	17 l. 500 c.c.
Oil of lavender	300 grams
" bergamot	40 "
" lemon	40 "
" cloves	25 "
" sweet orange	10 "
Distilled water	2 l. 500 c.c.

According to the *American Perfumer*, toilet waters of the "Florida water" class are in great demand in Chinese markets. The inhabitants use it, not only in the toilet, but also even in public at the theatre. Perfumes of French origin are most sought after.

Florida Water (containing but little alcohol)

Distilled water	15 litres
Oil of lavender	250 grams
" bergamot	15 "
" lemon	15 "
" cassia	15 "

Dissolve the oils in a litre of alcohol and then add the prescribed quantity of water; add to the mixture 100 grams of

boric acid and heat to boiling point in a closed vessel. The boric acid may be dissolved in boiling water, and the solution of oils should then be added to it. Filter carefully with the aid of carbonate of magnesia.

Florida Water (another formula)

Alcohol	4 l. 300 c.c.
Rose-water.....	1 litre
Linalol	40 grams
Oil of lavender	50 "
Eugenol	20 "
Oil of lemongrass	14 "

Florida Water (another formula)

Alcohol	2 l. 450 c.c.
Oil of bergapnot.....	16 grams
„ lemon	10 "
„ bitter orange	5 "
„ lavender	10 "
„ cloves	1 "
„ cassia	1 "
„ neroli, synthetic	1 "

Add $\frac{1}{2}$ litre of rose-water and shake well. If the mixture becomes cloudy, add 25 grams of carbonate of magnesia, leave for twenty-four hours with constant stirring, and then filter through paper.

Florida Water (for Japan)

Alcohol	3 l. 700 c.c.
Oil of lavender	40 grams
„ rosemary	20 "
Citral	5 "
isoEugenol	5 "
Oil of cassia	5 "
„ pennyroyal	15 "
Infusion of orris	150 "
„ storax	20 "
Vanillin	5 "
Water	1 l. 300 c.c.

Cananga Water

Alcohol	18 l. 500 c.c.
Oil of cananga	50 grams
Infusion of orris	1 l. 225 c.c.
Artificial oil of bitter almonds	4 grams
Oil of bergamot.....	100 "
Distilled water	2 l. 500 c.c.

Cananga Water (without Alcohol)

Distilled water	15 litres
Oil of cananga	25-50 grams
„ bitter almonds	2-5 "
„ bergamot.....	50 "
„ lemon	15 "

Make as Florida water containing only a small quantity of alcohol.

TOILET WATERS

201

Cananga Water (better quality)

Alcohol	18 l. 500 c.c.
Infusion of orris, 1	900 c.c.
Solution of artificial essence of bitter almonds	125 grams
Tincture of artificial musk	200 "
Oil of bergamot	100 "
Citral	5 "
Oil of lemon	50 "
„ cananga	500 "
„ ylang-ylang (artificial)	10 "
Water	7 l. 500 c.c.

Eau Divine

Alcohol	18 l. 500 c.c.
Infusion of orris	600 c.c.
Oil of geranium	100 grams
„ bergamot	50 "
„ lemon	50 "
„ artificial neroli	5 "
Geraniol	25 "
Distilled water	7 l. 500 c.c.

Nelsina Water

Alcohol	6 l. 125 c.c.
Oil of bergamot	75 grams
„ geranium	50 "
Infusion of benzoin, 1	300 c.c.
„ jasmine	2 l. 450 c.c.
„ tuberose, 1	1 l. 225 "
Vanillin	10 grams
Infusion of musk	50 grams
Essence of rose (artificial)	5 "

Sweet Orange Water

Alcohol	9 l. 200 c.c.
Oil of sweet orange	250 grams
„ bitter orange	50 "
„ lemon	25 "
„ bergamot	25 "
Tincture of benzoin	100 "
Distilled water	2 l. 250 c.c.

Another Formula

Alcohol	6 l. 125 c.c.
Oil of sweet orange	400 grams
„ lemon	100 "
„ bergamot	60 "
„ Algerian geranium	20 "
Citral	10 "
Water	1 litre

Eau d'Espagne

Alcohol	6 l. 125 c.c.
Oil of bergamot	80 grams
„ neroli (artificial)	25 "
„ lemon	30 "
„ rosemary	6 "
Orange-flower water	150 "
Benzyl alcohol	10 "
Citronellal	5 "
Water	900 c.c.

Verbena Water

Alcohol	6 l. 125 c.c.
Oil of verbena	200 grams
„ bergamot	80 „
Citral	10 „
Geraniol	25 „
Infusion of musk	100 „
„ balsam of tolu	100 „
Dianthine	20 „
Tincture of civet (artificial)	50 „
Rose-water	1 litre

Eau des Bayadères

Alcohol	3 l. 700 c.c.
Tincture of musk (artificial)	100 grams
Oil of thyme	3 „
Tincture of cassie (artificial)	1 l. 225 c.c.
Oil of rosemary	4 grams
isoEugenol	3 „
Bouvardia	10 „
Citral	3 „
Oil of lavender	10 „
„ bergamot	50 „
Geraniol	26 „
Orange-flower water	1 l. 800 c.c.

Royal Lavender Water

Alcohol	4 l. 500 c.c.
Infusion of orris	300 grams
Tincture of musk (artificial)	75 „
Infusion of balsam of tolu	100 „
„ storax	100 „
„ benzoin	100 „
Oil of balsam of Peru	15 „
Infusion of ambrette	50 „
isoEugenol	8 „
Oil of cassia	3 „
„ bergamot	300 „
„ lemon	32 „
„ lavender	50 „
„ caraway	2 „
Anythole	1.5 „
Oil of neroli (artificial)	2.5 „
Geranyl acetate	2.5 „
Water	750 c.c.

Lavender Water (Double Ambrée)

Alcohol	6 l. 125 c.c.
Oil of lavender	90 grams
„ lemon	10 „
„ Algerian geranium	5 „
Extract of balsam of Peru	32 „
Tincture of musk (artificial)	50 „
„ civet	25 „
„ storax	150 „
Vanillin	10 „

TOILET WATERS

203

Lavender Water

Alcohol	3 l. 750 c.c.
Oil of lavender	100 grams
„ thyme	10 „
Tincture of musk	10 „
Distilled water	500 c.c.

Hermosura Water (for Central and South America)

Alcohol	7 l. 500 c.c.
Oil of bergamot.....	100 grams
„ rose (artificial)	20 „
Citral	5 „
Oil of lemon	40 „
Geraniol	30 „
Essence of neroli artificial.....	5 „
Vanillin	10 „
Infusion of benzoin.....	100 „
Rose-water.....	2 litres

Mimosa Water

Infusion of rose, III	4 l. 900 c.c.
„ cassie, II	2 l. 450 „
Synthetic mimosa	80 grams
Vanillin	3 „
Oil of bergamot.....	10 „
„ geranium	2 „
„ patchouli	1 gram
Infusion of musk	10 grams
„ benzoin	100 „
Rose-water.....	1 litre
Borax	35 grams

TOILET WATERS WITH DILUTE ALCOHOL

The incessant increase of taxation on alcohol places the perfumer under the necessity either of selling his products at excessive prices, resulting in loss of customers, or of lowering their alcoholic strength to such a degree as may maintain prices at a reasonable level and so give satisfaction to the greatest possible number.

His interests would frequently seem to drive him to this second alternative, and further recent developments make it easy for him. There are now at his disposal terpeneless essences very soluble in weak alcohol, floral essences of a high degree of solubility, and numerous and varied synthetic perfumes which enable him to manufacture excellent preparations at a reasonable price, without a high percentage of alcohol.

For toilet waters and hair lotions, an alcoholic strength of 40 to 50 per cent. is amply sufficient. Further, lotions strong in alcohol are far from being the best for scalp massage, and the

least that can be said of them is that they diminish the natural brilliancy of the hair.

Whilst lowering the percentage of alcohol in these products, perfumes may be dissolved to a slight extent in such solvents as glycerine, which act beneficially on the hair. Castor oil should, of course, be avoided, as not being soluble in these liquids.

In making up the preparation care should be taken not to use more of any perfume than can be dissolved by the liquid, as the undissolved substances would be separated on filtration and cause a loss.

Syringa Toilet Water

Alcohol	3 litres
Distilled water	4 l. 500 c.c.
Terpineol	25 grams
Vanillin	1 gram
Hawthorn	3 grams
Terpenecss oil of bergamot.....	1 gram
Oil of cananga	1.5 grams

Violet Toilet Water

Alcohol	3 litres
Distilled water	4 l. 500 c.c.
Synthetic violet	10 grams
Benzyl acetate	1.5 "
Terpenecss oil of ylang-ylang.....	0.5 gram
Infusion of musk	18 grams
Essence of violet leaves	0.5 gram

The products resulting from the above formulæ have 38 per cent. alcohol; it is even possible to prepare these products with 20 per cent. alcohol, but in that case only terpenecss essences can be used. If the toilet waters of this category are somewhat less strong as a perfume, they leave nothing to be desired from the point of view of delicacy. A trace of vanillin always produces an excellent effect on them.

TOILET WATERS WITHOUT ALCOHOL

The incessant increase of import duty into most countries on products containing alcohol, and, on the other hand, the decrease in price due to international agreements, etc., and the necessity of satisfying the needs of those whose purses are not too long, are the main causes whereby the makers have diminished little by little the percentage of alcohol and finally have prepared perfumes without alcohol at all.

Viewed from the strictly professional standpoint, perfumes without alcohol are of small interest, and their manufacture has

nothing to flatter the artistic skill of the perfumer. However, in certain countries, such as Central America, Turkey, Egypt, etc., these products are in great demand among the masses, who there form the majority of purchasers. Perfumes with a patchouli base are especially in demand, though these products, weak or even lacking in alcohol, are only of mediocre quality, they attain their object, which is to destroy the odour of perspiration, and this is the peculiar reason for the use of perfumes among the poorer classes in those countries.

The manufacture of perfumes weak in alcohol or free from it is not so difficult as would at first sight appear; the chief obstacle lies in filtration, for this operation, unless care is taken, may cause a considerable loss of essential oils.

Indeed, it is well known that there are very few essential oils which are soluble to any extent in water, and that they are separated on filtration and remain on the filter-paper. It is better to use terpeneless oils, which have the advantage of being considerably more soluble and much easier to filter. The method of use is as follows.

First, the essential oils are dissolved in a little alcohol, the water is warmed to boiling point, and the perfumes dissolved in the alcohol are added; the mixture is then boiled and the receptacle is covered and left to cool. After cooling, the perfumes "without alcohol" are left standing for about three weeks and then filtered; perfumes weak in alcohol, after mixing and cooling, receive an addition of alcohol, and are then merely filtered. Any residual oil which has not been dissolved by the water dissolves in the added alcohol.

For these perfumes weak in alcohol a cold process is equally applicable, provided that they are allowed to mature sufficiently. The essential oils are dissolved in the proper quantity of alcohol, water is added, and the mixture left to itself. However, it is as well, after mixing the liquids, to add a little carbonate of magnesia and to submit the whole to a further agitation two or three times. Finally, the liquid is left to stand at least three months, after which it is filtered through magnesia or asbestos paper. To perfumes without alcohol add as preservative a little boric acid dissolved in boiling water.

The most simple perfumes without alcohol are the aromatic waters obtained by the distillation of flowers in the South of France; rose-water and orange-flower water are amongst these. They can be used as bases in the manufacture now being dealt

with, but as regards price they are perhaps too costly for exportation, and their place may be taken by synthetics. Synthetic jasmine lends itself well to these operations, and vanillin, too, is relatively very soluble in water, whilst heliotropin has only given negative results, since it dissolves at the rate of less than 1 gram in 1000 grams of water. Terpineol and essence of cananga give a very accentuated lilac perfume, even in a weak solution of alcohol. The chief difficulty lies in the clarification by rapid filtration without loss of the principal odour-bearers. Carbonate of magnesia and kaolin are very well adapted for this filtration; next in order of convenience is asbestos filter-paper and then albumin, which need only be tried when the others have failed.

The finished perfumes are coloured with saffron, or with aniline colours which have been previously dissolved in water or in alcohol. The colours can also be added immediately after perfuming the water. The quality of the water has much influence on these operations; ferruginous water is unfitted for this manufacture, and chalky water renders filtration difficult. It is best to use distilled water, which saves a good deal of trouble, or, failing that, water boiled three or four times and decanted after standing.

Another method of preparation of perfumes without alcohol, or weak in it, consists in making decoctions of leaves or perfumed roots. These are boiled in a closed vessel, as, for example, patchouli leaves, sandalwood, vetiver roots, ground ambrette seeds, orange-peel, the extracted residue of musk, etc. By this means perfumed waters are obtained, relatively easy to filter and not requiring long storage. When mixing these different waters, add dissolved essential oils and synthetic perfumes to obtain any desired odour.

This last-mentioned method of manufacture of perfumes without alcohol, or weak in it, is much to be recommended. It is a little more complex than the other methods, but it is more sure and gives a wider range of odours. It demands a more difficult filtration than is usual, and is only worth while if relatively large quantities are made, and if there is a ready sale for this type of product.

Perfumes and toilet waters the alcoholic strength of which does not exceed 8 per cent. are considered as perfumes without alcohol, the alcohol contained being only for the purpose of dissolving the essential oils and to cause them to mix more readily with water.

Just as in the case of better-grade perfumes, it is necessary to employ fixatives to give stability and endurance to the perfumes. We have previously enumerated the principal fixatives, of which the best are aromatic resins, musk, etc., as infusions in alcohol. For perfumes without alcohol, aromatic resins are not suitable, for not only are they insoluble in water, but their alcoholic solutions give with water milky and unfilterable solutions. For this reason, recourse is had to ambrette seeds, which are crushed in a porcelain mortar and left to soak for an hour in boiling water in a closed vessel. By taking 1 kilogram of seeds to 10 litres of water, a solution strong enough for perfume is obtained; this is left for a few days and then filtered. In the same way, other preparations of this kind are prepared with 10 to 20 per cent. as bases (patchouli leaves, vetiver roots, sandalwood, cedarwood, flowering tops of lavender, coriander seeds, fresh rose-petals, etc.); the solutions thus obtained can be used alone or mixed with distilled aromatic waters made in Southern France (orange-flowers, tuberose, cassie, rose, etc.) which form excellent bases when they can be obtained reasonably. Finally, it would be impossible to obtain strong odours in products of this category if it were not for patchouli, lilac, hyacinth, orange, tuberose, rose, heliotrope, and vanillin, and especially, the resources offered by synthetic perfumes. The following are examples of manufacture :

• *Patchouli*

Penang patchouli leaves	1 kilogram
Water	10 litres

Boil for one hour in a covered vessel, allow to settle, and filter through a strainer. To this solution add a decoction of 500 grams of ambrette seeds and from 5 to 10 grams of patchouli oil dissolved in 200 grams of alcohol and then 100 grams of salicylic acid dissolved in water. Boil the mixture and place in a well-tinned vessel; add 300 to 500 grams of kaolin or 100 grams of carbonate of magnesia, mix well, close the vessel, and leave to stand for a month. Lastly filter through carbonate of magnesia and colour emerald green.

• *Lilac*

Decoction of ambrette seeds	3 kilos.
Lavender water	10 "
Terpineol dissolved in 300 grams of alcohol	50 80 grams
Salicylic acid	50 "

Colour lilac.

Hyacinth

Decoction of ambrette seeds	3 kilos.
Lavender water.....	10 „
Hyacinthine dissolved in 200 grams of alcohol	20-30 grams
Salicylic acid	50 „

Colour saffron.

Heliotrope

Mix 20 grams of heliotropin with 500 grams of water and add 100 grams of alcohol. Place the mixture in a beaker and bring to the boil on a gas jet. Heliotropin, though little soluble in water, is sufficiently so to impart a good perfume to the water. After a lengthy boiling, allow the beaker to stand a few minutes, during which the undissolved heliotropin will sink to the bottom of the vessel. Decant the liquid carefully, and pour into the beaker 100 to 200 grams of alcohol, which will dissolve the remaining heliotropin; this solution can be used in the manufacture of articles for immediate sale. To the decanted mixture add:

Decoction of ambrette seeds	3 kilos.
Lavender water.....	20 „
Jasmine water	2 „

Jasmine water is prepared by dissolving 10 grams of synthetic jasmine in 100 grams of alcohol and adding this solution to 10 litres of boiling water with 10 grams of salicylic acid.

The perfumes of heliotrope and vanillin thus obtained become slightly red or brown, especially if exposed to the light; the same inconvenience is present in the same products dissolved in alcohol. Vanillin water is prepared in the same manner, and is soluble in water in the proportion of 8 in 1000.

A perfume can be given to these compositions more or less intense according to price, either by strengthening with aromatic waters or by diluting with distilled water. The important point is to fix the cost price in order to avoid disagreeable surprises and to have a regular market for this type of preparation.

A category of products in great demand in certain foreign countries is that of toilet waters (to be distinguished from similar products with an alcoholic basis) of the following inexpensive type.

Appended are some formulæ:

Florida Water

Ambrette seed water	3 kilos.
Sandalwood water	20 „
Terpenes oil of bergamot (dissolved in 200 grams of alcohol)	5 grams
Peppermint water.....	5 kilos.
Salicylic acid	100 grams

TOILET WATERS

209

• *Cananga Water*

Ambrette seed water	3 kilos.
Orange-flower water	20 „
Oil of cananga (dissolved in 200 grams of alcohol)	25 grams
Rose-water.....	10 kilos.
Salicylic acid	100 grams

Eau Divine

Ambrette seed water	3 kilos.
Rose-water.....	20 „
Vetivert water	10 „
Patchouli	1 kilo.
Jasmine	1 „
Salicylic acid	100 grams

These toilet waters form an important article of export to the tropics, and they should be manufactured in different grades according to the market requirements.

EAU DE COLOGNE

Eau de Cologne is one of the most sought after and valued toilet waters, and is much in favour in all civilised countries. Its inventor, Jean-Marie Farina, was born at Sainte-Marie Majeure in Italy, and went to Cologne in order to trade in perfumes, and it was there, in 1709, that he invented the famous toilet water to which he gave the name of the town. His descendants have received and kept the secret of the product, which they still make to-day.

According to another version, Eau de Cologne was invented at Milan by Paul de Feminis and manufactured at Cologne since 1690. De Feminis then passed on his secret to his nephew, Jean-Antoine Farina, who started the manufacture in Paris in 1806. Roger and Gallet have since 1862 owned his trade mark.

Whichever is correct, Eau de Cologne has been in great favour from the eighteenth century. Other makers imitated the product, but as the trade mark "Farina" hindered them in their efforts, they found it very easy to fetch from Italy some offshoots of the family of Farina, which was very large, it seems, and to associate them with their business, thus gaining the right to have the name Farina figure in their trade mark. This question of trade mark has been the object of endless law suits. However, several Farina companies prospered, and there are now several in Cologne, though it is impossible to say which one works according to the original recipe.

There is also another question. At present both French and English Eau de Cologne are in considerable vogue. They constitute an incomparable toilet water, and possess tonic and refreshing qualities which make them sought after by society.

Are these properties caused by the various essential oils which are therein contained, or by the quality of the alcohol used? It is perhaps best not to express an opinion on so delicate a question, but probably the great popularity of the product is due, not only to a happy association of aromatic substances, but also to the minute care used in its preparation.

Whatever it may be, experience proves that to obtain a good Eau de Cologne the choicest essential oils must be used in conjunction with alcohol carefully rectified and perfectly neutralised. There is another essential condition for best-quality Eau de Cologne: the aromatic mixture must mature for a year, if possible, whatever be the essence used. The true bouquet peculiar to this toilet water can only be obtained under these conditions.

Eau de Cologne, Jean-Marie Farina, by Distillation

Fresh melissa.....	10 kilos.
Rosemary	5 "
Orris (Florentine)	1 kilo.
Alcohol	25 litres
Water	4 "

Cut the plants into small pieces, shake together with the orris, place together in the vat the plants, the alcohol and the water, and leave in contact for twelve hours—then distil at a moderate heat. To the product resulting from this distillation add:

Alcohol	25 litres
Essence of bergamot	310 grams
" lemon	250 "
" sweet orange	250 "
" neroli	60 "
" petitgrain	60 "
" Alpine lavender	120 "

Leave for a month, then filter and bottle.

Observations on Eau de Cologne.—In preparing Eau de Cologne otherwise than by distillation, mix the essences and infusions with alcohol, stir from time to time for a week, and then reduce to the alcoholic strength indicated for each number. Eau de Cologne of 80 per cent. and over should be left for a fortnight, and for a month if below 80 per cent. Then filter and bottle. If it is desired to colour the product, use caramel for ordinary Eau de

TOILET WATERS

211

Cologne, saffron and arthil for the special varieties. Finally, before everything, the taste of the consumer must be considered.

Another Formula

Alcohol 95 per cent.	80 litres
Water	10 "
Orange-flower water	10 "
Oil of peppermint	24 grams
" lemon	160 "
" bergamot.....	160 "
" sweet orange	125 "
" rosemary	95 "
" lavender	95 "
" thyme	95 "
" petitgrain	60 "

Another Formula

Alcohol 95 per cent.	30 litres
Infusion of orris, 1	1 litre
" ambrette, 1	1 "
" musk, 1	30 grams
" vanilla, 1	30 "
" benzoin, 1	60 "
Oil of neroli	65 "
" petitgrain	20 "
" sweet orange	170 "
" bergamot.....	650 "
" lemon	260 "
" rosemary	40 "

Reduce to 92 per cent. alcoholic strength with distilled water.

Another Formula

Alcohol	9 litres
Oil of bergamot.....	50 grams
" petitgrain	20 "
" neroli	10 "
" rosemary	10 "
" Alpine lavender	20 "
" sweet orange	50 "
Infusion of musk, 1	30 "
" vanilla, 1	20 "
" benzoin, 1	50 "

Reduce to 85 per cent. alcoholic strength with distilled water.

Another Formula

Alcohol	40 litres
Infusion of benzoin, 1	250 grams
" musk, 1	50 "
Oil of sweet orange	50 "
" Alpine lavender	100 "
" rosemary	50 "
" lemon	250 "
" petitgrain	100 "
" bergamot.....	250 "

Reduce to 80 per cent. alcoholic strength with distilled water.

Another Formula

Alcohol	35 litres
Oil of lemon	200 grams
„ lavender	125 „
„ thyme (white).....	50 „
„ rosemary	75 „
„ bergamot.....	125 „
Infusion of benzoin, 1	300 „

Reduce to 75 per cent. alcoholic strength with distilled water.

Another Formula

Alcohol	25 litres
Oil of lemon	150 grams
„ lavender	225 „
„ thyme (white).....	100 „
„ peppermint	5 „
„ rosemary	50 „
„ bergamot.....	100 „
Infusion of benzoin, 1	250 „

Reduce to 50 per cent. alcoholic strength with distilled water.

Eau de Cologne, No. 1

Alcohol	5 litres
Acetic acid	500 grams
Oil of thyme (white).....	50 „
„ cloves	25 „
„ rosemary	50 „
„ lavender	175 „

Reduce to 30 per cent. alcoholic strength with distilled water.

Another Formula

Alcohol 36 per cent.	30 litres
Oil of bergamot.....	250 grams
„ lemon	250 „
„ sweet orange	150 „
„ rosemary	15 „
„ thyme	5 „
„ lavender	10 „
„ petitgrain	30 „
„ neroli	25 „
„ cloves	15 „
„ peppermint	5 „
„ cedrat	150 „
„ limes	90 „
Infusion of musk	20 „
„ benzoin	50 „
Orange-flower water	1 litre

For some years special Eau de Cologne has been made in Germany, by adding to the perfume of this product the perfumes of certain flowers; by this means Eau de Cologne bouquets are obtained. But this type of mixture has hardly achieved success, and the “Farina” firms continue to make Eau de Cologne after the old formulæ, and thus exclude the use of

synthetics. However, the latter offer valuable resources here, especially artificial essence of neroli; at least in the preparation of the lower-grade Eau de Cologne, which has been made commercially since 1895.

Citral, irolene, methyl ether of cinnamic acid, etc., can be used in the preparation of Eau de Cologne. The method of manufacture is unchanged, but the odour is somewhat modified by the use of synthetics. Extra fine 95 per cent. alcohol is used, and water is added three or four days afterwards in the different formulæ.

Vinegar Eau de Cologne

Eau de Cologne	10 litres
Water	1 litre
Acetic acid, 30 per cent.	300 grams
Acetic ether	200 "

Very refreshing - excellent for export to warm countries.

Bath Eau de Cologne

Alcohol	10 litres
Water	5 "
Common salt	900 grams
Oil of bergamot	60 "
„ lemon	80 "
„ rosemary	10 "
„ lavender	10 "
Irolene	5 "

Calms and strengthens the nerves.

Grecian Eau de Cologne

The preparation of Eau de Cologne in Greece is a regular family industry. In many families the recipes are handed down from generation to generation.

Alcohol	7 litres
Oil of lemon	100 grams
„ bergamot	100 "
„ petitgrain	80 "
„ neroli	20 "
„ rosemary	30 "
„ thyme	20 "
„ melissa	20 "
„ rosewood	15 "
„ Juniper	5 "
Orange-flower water	2 litres

Eau de Cologne for Export

Eau de Cologne is much exported, but unfortunately the quality demanded is often very poor and only a small margin of profit is left; besides, the import duties on alcohol are very

high in most countries, and makers are sometimes obliged to supply Eau de Cologne with a very small percentage of alcohol.

Eau de Cologne, 35 per cent.

Distilled water	50 litres
Alcohol, 95 per cent.	30 "
Oil of lemon (terpeneless)	100 grams
" bergamot (terpeneless)	80 "
" thyme	20 "
" rosemary	20 "
" lavender	10 "
Methyl cinnamate	20 "

The essences are dissolved in the proper quantity of alcohol, and then small quantities of water are added. The mixture becomes cloudy. Add 500 grams of carbonate of magnesia, stir to mix well, and leave the vessel uncovered for some minutes to allow the carbonic acid which the liquid gives off to escape, then cover the vessel and leave for a month. Then filter, adding to the filter a little magnesia or chalk—two or three filtrations are required to obtain a clear marketable product.

A little citral dissolved in alcohol and added before filtration will improve the finished product.

Eau de Cologne, 40 per cent.

Distilled water	29 litres
Alcohol, 95 per cent.	21 "
Oil of bergamot (terpeneless)	50 grams
" lemon (terpeneless)	50 "
Citral	10 "
Oil of thyme	20 "
" rosemary	20 "
" lavender	50 "
Methyl cinnamate	25 "

This product is fairly cheap and very convenient for export. As has already been stated, this type of Eau de Cologne, weak in alcohol, should be matured for some time. It is a good thing to prepare certain quantities, say 500 litres, at a time and to leave them in store for six or eight weeks.

Eau de Cologne Weak in Alcohol (30 per cent.)

The manufacture of still weaker grades is hardly a paying proposition, and in these brands the cost must be carefully watched if monetary losses are to be avoided.

This type of manufacture is not entirely free from difficulty, and some notes are appended.

Solutions of oils, mixed with water, produce cloudy emulsions.

The use of terpeneless essences is thus indicated. First they are dissolved in strong alcohol, which is then mixed with water; further, there may be added carbonate of magnesia, and the mixture well triturated in a mortar; then add the water. The mixture of water and essences should be left for a month. Then filter with magnesia, or kaolin, which takes a long time. Filtration is difficult, and causes a certain loss of essence. If the mixture will not filter clear, add a little albumen; if necessary the filter may be of felt lined with asbestos cloth. Good results are obtained by boiling the water, stirring in the oils dissolved in alcohol, and then closing the vessel and leaving the mixture for some time before filtration. The strength of the perfumes cannot be made high, for a mixture of 10 litres of alcohol at 95 per cent. and 30 litres of water can only dissolve about 12 grams.

Eau de Cologne of Stephen Smith & Co.

Some years ago the English firm of Stephen Smith & Co. established a competition for a good formula for Eau de Cologne. The prize recipe is the following, which has been published, and it seems to yield an excellent product:—

Alcohol, 95 per cent.	30 l. 200 c.c.
Orange-flower water	3 litres
Oil of bergamot	800 grams
„ lemon	400 „
„ neroli	80 „
„ thyme	20 „

To this series of Eau de Cologne formulæ, already somewhat lengthy, we must add the method of preparing the aromatic water used especially for disinfecting the sick-room.

Antiseptic Eau de Cologne

Eau de Cologne	1 litre
Chloral hydrate	28 grams
Quinine	2.4 „
Carbolic acid	72 „
Oil of lavender	3 „

The chloral is only used to mask the presence of the carbolic acid. There is also made a special water, used to disinfect linen, bedding, furniture and curtains.

Eau de Cologne	1 litre
Van Swieten's solution.....	$\frac{1}{2}$ „
Sodium chloride	10 grams

CHAPTER VI

COSMETICS

THE art of cosmetics (derived from the Greek *Kosmeo*) is that branch of hygiene which deals with substances used for preserving in good condition the exterior of the body. Such substances are very numerous, and comprise a great number of special preparations destined to be used as beauty aids to the face, hair, arms, hands, nails, etc.

To follow the logical sequence, the first care of the author should be to define "beauty"—not beauty from a philosopher's point of view, but human beauty, concrete, in flesh and bone. For, in spite of all the ink spilt in praise of the fair sex, the term "beauty" remains vague: everyone has his own ideas of it, everyone pictures it according to his soul and still more according to his natural instincts. What one finds beautiful, another shuns, and *vice versa*. Two kinds of beauty can be distinguished: natural or original beauty, and acquired beauty. The first is a gift of Nature, as precious as it is rare; it results in perfection and harmony of the expression and face lines and in the happy proportion of the limbs; it excites our admiration and captivates our sympathies. It is inseparable from good health and keen intelligence, which alone can give a face its true expression, its right character.

There also exist surface beauties where some essential is lacking—flowers without perfumes. Acquired beauty is the triumph of industry over human imperfections; it is the result of artifices being applied to natural or accidental blemishes, to soften the feature lines, to repair the inroads of time, illness, "good living," etc. But acquired beauty should be a matter of moderation, discretion, and care, else it may become an object of criticism.

The ancient Egyptians and, later, the Greeks and Romans showed a peculiar love for beauty culture; under its influence they achieved some remarkable results by the use of cosmetics and the practice of hygiene. In modern times, hygiene and

beauty culture have made real progress in that metallic poisons such as mercury and lead have been eliminated from cosmetics, and have been replaced by vegetable matter little or non-toxic. Further, it is now understood that natural beauty can only be preserved at the price of a well-regulated method of living.

Dr. Gaston, discussing the use of cosmetics, states that they may be useful or useless, necessary or harmful, according to the circumstances. Cosmetics are useless to young people whose skin is not dry or fatty and blotchy. They should not be used by people under thirty years of age. Cosmetics, especially cream powder, preserve the complexion against heat, cold, sun, rain, at the seaside, in the mountains, and in motor-cars. Badly prepared cosmetics are harmful, for they contain toxic or poisonous substances, and care in choosing should be exercised by persons with tender skins which peel or swell easily.

The proper means, then, to ensure the preservation of beauty consist in the practice of hygiene and habitual use of baths and massage.

Cosmetics comprise all toilet preparations, and can be classed in order of importance as follows:

I. *Cleaners*—comprising toilet soaps, liquid soaps, dentifrices, shampoos.

II. *Soothing*—such as cold creams.

III. *Fixatives*—such as pomades, fixatives for the moustache, etc.

IV. *Colouring*—powders, rouge, hair dyes.

V. *Devilatories*.

VI. *Refreshing*—toilet vinegar, smelling salts.

CLEANSING COSMETICS

SOAPS AND PASTES

The best cleanser is soap, and its use generally outweighs that of any other cosmetic. A distinction must be drawn between hard soaps, liquid soaps, and pastes with a soap base. Hard soaps, when neutral, exercise a fairly soothing action on the skin and are well suited to most people; when badly made and containing free caustic soda, they may be harmful in irritating and corroding the skin and hair. Soft soaps (potash soaps) exercise a biting, caustic action; they are sometimes used

unwisely to make shampoos by the addition of alcohol, petrol, etc. Soap enters also into the preparation of dentifrice pastes, which are of great value and achieve their purpose far better than powders. Shaving soaps are prepared with cocoa-nut soap cold, milled with a little mucilage of gum tragacanth and 0.5 to 1 per cent. of crude saponin and some cheap perfume; they give a lasting lather and answer their purpose well. For the purposes of the bath, soaps, alkaline carbonates and emollient substances are employed.

Most liquid soaps are alcoholic solutions of ordinary soaps; ethyl alcohol can be replaced by methyl alcohol or methylated spirit, as a solvent. The latter, being duty free, allows of a substantial reduction in price.

There are also special products, such as cocoa-butter soap, easily soluble in water, but very expensive; resin soaps and sulphuricimates, the latter being a solvent for glycerine and soap; and pure soft soaps. The preparation of soaps in the laboratory presents no difficulty. For example, 325 grams of water containing 45 grams of caustic soda and 10 grams of carbonate of soda are heated to saponify completely 300 grams of oil. Alcohol is then added.

Courtonne advises the following method: Take 50 grams of caustic potash (70 per cent.), 200 grams of oil of sweet almonds, and 70 grams of 90 per cent. alcohol. Warm the whole in a water-bath to complete saponification, which only takes a few minutes, then add, little by little, stirring to dissolve the soap, 160 grams of glycerine, 50 grams of distilled water, and 30 grams of perfume to taste. Filter the next day, if necessary. Chaplet has published several formulæ for the preparation of liquid soaps.

Liquid Face Soaps.—(A) Dissolve 1 kilo. of Marseilles soap cut into shavings in 1 litre of water and 1 litre of 90 per cent. alcohol; the soap thus obtained is very liquid. (B) Stir until completely dissolved a mixture of 1 kilo. of cocoa-nut oil, 500 grams of caustic potash, 1 litre of glycerine, and 1½ litres of 90 per cent. alcohol. When this soap is used for cleansing the scalp add 100 cm. of extract of quillaya.

Economical Liquid Cleansing Soaps for Schools and Workshops.—(A) Dissolve 1 kilo. of Marseilles soap and 500 grams of carbonate of soda in a mixture of 1 litre of alcohol and 1 litre of sulphuricinate of soda or ammonia. To remove the unpleasant odour of this product, perfume with 10 to 15 c.c. of lavender oil. (B) Dissolve 1 kilo. of crude soap in 1 litre of denatured alcohol

and $\frac{1}{2}$ litre of sulphuricinate. Perfume with 15 to 20 cm. of lavender oil.

When starting from soaps already manufactured, they must be cut up and dissolved by heating, though they should not be brought to boiling point. During the whole of the heating, stir well with a rod, and when all is dissolved the operation is finished. Leave to stand for a night to allow it to clarify, and then decant the liquid and use the residue in subsequent operations. For toilet soaps, properly so called, see the special chapter dealing with them.

Cleansing Pastes.—Pastes intended for washing the hands are composed of soap and softening vegetable matters. They are hardly used now, owing to their high cost, liquid soaps being preferred, as these can be obtained in more convenient containers and are more economical. Appended are some formulæ.

I

Almond paste	100 grams
White powdered soap	500 "
Carbonate of soda	80 "
Oil of lavender	3 "
" bergamot	3 "
" lemon	3 "
" cloves	1 gram

II. (Dorvault's Formula)

Almond paste	750 grams
Rice flour	125 "
" starch	125 "
Benzoin	30 "
Salts of tartar	30 "
Spermaceti	30 "

Perfume with $1\frac{1}{2}$ grams of lavender oil, $1\frac{1}{2}$ grams of rosewood oil, and $2\frac{1}{2}$ grams of oil of cloves.

Almond paste is made from a mixture of different powders, some formulæ for which follow.

Almond Powder for the Hands

Bitter almond powder	400 grams
Horse-chestnut	500 "
Venetian chalk	50 "
Florentine orris powder	50 "
Carbonate of potash	5 "
Terpineol	2 "

This mixture can either be used for making almond paste, or directly as a cleanser; it softens the hands as well as cleansing them, horse-chestnut containing a strong proportion of saponin.

Soapy Almond Powder for the Hands

Powdered bitter almonds	100	grams
„ horse-chestnut	600	„
„ orris	100	„
„ soap	200	„
Carbonate of potash	5	„
Oil of bergamot	2	„
Heliotropin	1	gram
Vanillin	1	„
Ionone	0.5	„

Almond Paste for Whitening the Hands

To obtain an excellent almond paste for the hands triturate one of these powders with glycerine of starch a few days old.

SHAMPOOS

Under the name of shampoos, solutions of soft soap are used for cleansing the hair; other emulsive matters in very weak alcohol are sometimes used. Perfumes to taste are added to these solutions. Besides shampoos, lotions with antiseptic bases or pilocarpine and other pharmaceutical products are used. Several formulæ are appended, but they can be varied indefinitely to suit individual tastes.

French Shampoo

First quality soft soap	100	grams
Carbonate of potash	200	„
Distilled water	2	litres

Boil and add to the liquid when quite cold :

Infusion of vanilla, II	200 to 500	grams.
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Jockey Club Shampoo

First quality white soap	60	grams
Carbonate of potash	14	„
Distilled water	500	„

Boil and, when cold, add :

Alcohol, 95 per cent.	100	grams
Jockey Club extract	10	„

Parisian Shampoo

Carbonate of ammonia	10	grams
Rose-water	500	„

Dissolve in cold state, and add :

Alcohol	100	grams
Oil of French geranium	75	„

• Panama Shampoo

Extract of Panama	1 litre
Rose-water	2 litres
Ordinary Eau de Cologne	1 litre
Alcohol	$\frac{1}{2}$ "

Alcohol Shampoo

Alcohol	800 c.c.
Eau de Cologne, No. 3	3 l. 200 c.c.
Water	3 l. 200 c.c.
Borax	200 grams
Glycerine	100 "

Another Formula

Water	75 litres
Crude soap	25 kilogs.
Crude potash	1.700 "
Oil of mirbane	200 grams

Dissolve the soap in a water-bath, place the water in a beaker, add the potash, then the soap and the essence of mirbane; stir well and leave for twelve hours. The vessel should have two taps, one at the bottom and the other higher up, the latter being used to draw off the clear liquid for bottling.

Bay Rum Shampoo

Alcohol, 95 per cent.	1 litre
Distilled water	1 "
Glycerine	40 grams
Oil of bay	4 "
" pimento	3 "
" sweet orange	1 gram
Refined potash	2 grams
Potash soap	3 "

Proceed as follows: Pour the alcohol into an appropriate vessel and the essential oils and stir to mix well. Then dissolve the potash and the soap in the correct amount of water, add the solution, then the glycerine, stir, and when sufficiently well mixed add the liquid to the perfumed alcohol. The product will be slightly cloudy and of a clear yellow colour; leave for five or six days and bottle. Filter once before placing in flasks for export. If on first filtering unsatisfactory results are obtained, place a little magnesia and chalk in the filter; this will clarify the product perfectly.

Sulphuricinate Shampoo

Sulphuricinate of soda or ammonia	100 grams
Water	100 "
Terpeneless oils of Eau de Cologne	1 gram

By this formula a concentrated shampoo is obtained pleasant to use and easy to sell. This can be applied direct to the scalp

and washed in, or dissolved in water before application. The quantity for a shampoo is 30 to 40 grams (Gattefossé).

Shampoo de Staffe

Boiling water	1000	grams
Carbonate of soda	30	"
Pure soap	15	"
Alcohol	20	"
Perfume <i>ad lib.</i>		

Cerbelaud Shampoo

Prepare the following mixtures:—

I {	Crude soap	50	grams
	Distilled water	500	"
II {	Carbonate of potash	20	"
	Distilled water	400	"
III {	Glycerine, 30° B.	25	"
	Artificial almond oil or terpineol	162	"

Mix and add 100 to 200 cm. of distilled rose-water. Filter through soft paper. An excellent shampoo, but a little strong for tender skins.

Shampoo Powder (Ferville)

Carbonate of soda (anhydrous)	20	30	grams
Powdered soap	60-100		"
Borax	10-20		"
Saponin	1		gram
Oil of rose geranium	2-10		grams

Put up in packets of 10 to 15 grams to be used in 1 litre of water.

Shampoo Powder

Bicarbonate of soda	500	grams
Carbonate of ammonia	50	"
Borax	50	"

Add a little alcohol, stir well, and then add water to taste. This may be perfumed to various degrees. Formulæ are appended:

Violet

Oil of bergamot	12	grams
" cananga	9	"
Synthetic violet	1.5	"

Rose

Geraniol	18	grams
Oil of rose (synthetic)	3	"
" santal	3	"

Heliotrope

Heliotropin	18	grams
Vanillin	3	"

Shampoo Water

Distilled water	15 litres
Alcohol	2 "
Glycerine	400 grams
Ammonia, 10 per cent.	200 "
Bicarbonate of soda	700 "
Borax	100 "
Terpeneless oil of orange	6 "
" " lemon	6 "
" " bergamot	5 "

WATERS FOR LOTIONS FOR SCALP MASSAGE

As has been stated above, waters are used chiefly to remove grease from the hair, to remove dust and blackheads, and to ensure preservation and growth. As some people cannot use pomades and perfumed oils, it is sometimes necessary to remember this prejudice in preparing waters for lotions, and to add a certain proportion of chemically pure glycerine, which makes the hair glossy. In such cases, hair lotion should replace pomades and oils.

Waters for hair lotions are variously coloured according to the tastes of customers. We shall not go into details here, as elsewhere formulæ will be given for colouring each product.

An important point is not to give such product a larger percentage of alcohol than 50 to 60 per cent., as alcohol has the disadvantage of drying the hair too much and discolouring it slightly, giving it a greyish, dusty appearance, which necessitates the use of pomades and oils.

Rhum Lotions

Martinique rhum	5 litres
Alcohol	5 "
Infusion of orris, 1	3 "
" benzoin, 1	250 grams
" vanilla, 1	250 "
" ambrette, 1	500 "
" Tonquin bean, 1	200 "
" tannin, 1	100 "
Glycerine	15 "
Oil of santal	10 "
" white thyme	10 "
" cloves	68 "
" Alpine lavender	68 "

Reduce to 60 per cent. alcoholic strength with orange-flower water.

Skin Lotion

Alcohol	4 litres
Infusion of orris, I	1 litre
" ambrette, I	1 "
" tuberoze, II	500 grams
" balsam of tolu, I	250 "
" tonquin bean, I	250 "
" vanilla, I	100 "
" balsam of Peru, I	60 "
" rose, II	2 litres
Oil of bergamot	15 grams
" cloves	2 "

Reduce to 60 per cent. alcoholic strength with distilled water.

Quinine Lotion

Alcohol	45 litres
Infusion of vanillon, I	60 grams
" vanillon, II	500 "
" vanillon, III	105 "
" cloves, I	500 "
" cloves, II	500 "
" balsam of Peru, I	65 "
Quinine	45 "
Oil of geranium	28 "
" lemon	46 "
" bergamot	90 "
Infusion of civet, II	11 "
" musk, II	11 "

Reduce to 60 per cent. with distilled water.

Quinine Lotion (Another Formula)

Alcohol	3 l. 400 c.c.
Infusion of tuberoze, III	400 grams
Linalol	10 "
Geraniol	10 "
Terpeneless oil of bergamot	1.5 "
Cheiranthia	0.5 gram
Tincture of quinine	100 grams
" zibethin, 1 per cent.	10 "
" rose	75 "
Dianthine	3.5 "
Tincture of cantharides	30 "
Rose-water	1 l. 850 c.c.

Colour with cochineal.

Quinosol Lotion (New Formula)

Alcohol	3 litres
Neutral glycerine	50 grams
Quinosol	4 "
Linalol	3 "
Oil of geranium	10 "
Terpeneless oil of bergamot	5 "
Tincture of benzoin	10 "
Distilled water	1 l. 500 c.c.

This lotion may be used, not only for cleansing the scalp and strengthening the roots of the hair, but also for preventing blackheads. These properties are due to the presence of quinosol, which is a chemical product consisting of oxyquinoline sulphonate of potassium; it is put up in the form of a bright yellow crystal powder, perfectly soluble in water and with a slight odour. It is a powerful antiseptic, and may be used to make certain dentifrices.

Quinine Lotion, No. 2

Alcohol	23 litres
Oil of geranium	19 grams
„ bergamot	42 „
„ lemon	42 „
„ niobe	6 „
Quinine	12 „

Reduce to 50 per cent. with distilled water.

Quinine Lotion, No. 3

Alcohol	23 litres
Oil of bergamot	115 grams
„ lemon	115 „
„ geranium	60 „
„ niobe	15 „
Infusion of tannin	30 „
Quinine	12 „

Reduce to 60 per cent. with orange-flower water.

Eau de Quinine Dye

Alcohol	1 litre
Rose-water	400 c.c.
Oil of bergamot	10 grams
Geraniol	3 „
isoEugenol	1 gram
Cinnamon	0.50 „
Tincture of call nts	66 grams
„ cantharides	16 „
Sulphate of quinine	3 „
Glycerine	60 „

Colour with cochineal.

Sweet Orange Lotion

No. 1

Alcohol, 95 per cent.	5 litres
Oil of sweet orange	150 grams
„ geranium	2 „

• Reduce to 60 per cent. with orange-flower water.

No. 2

Alcohol	28 litres
Infusion of vanilla, 11	400 grams
Sweet orange oil	1 litre

Reduce to 50 per cent. with distilled water.

No. 3

Alcohol	27 l. 350 c.c.
Sweet orange oil	500 grams

Reduce to 50 per cent. with distilled water.

No. 4

Alcohol	22 l. 750 c.c.
Sweet orange oil	250 grams

Reduce to 30 per cent. with distilled water.

Verbena Lotion

Take 5 litres of verbena toilet water and reduce to 50 per cent. alcoholic strength.

Violet Lotion

Alcohol	3 l. 750 c.c.
Infusion of violet, I	1 litre
„ cassie, II	1 „
„ rose, II	500 grams
„ vanilla, II	65 „
„ vanillon, II	100 „
„ benzoin, I ^r	35 „
Oil of bergamot	50 „
„ geranium	3 „
„ santal	5 „

Reduce to 50 per cent. alcoholic strength with distilled water.

Vegetable Violet Lotion

Alcohol, 95 per cent.	1 litre
Distilled water	1 „
Infusion of orris	200 grams
Tincture of orris oil, 1 per cent.	50 „
„ vanillin, 10 per cent.	25 „
Infusion of musk	10 „
Glycerine	18 „
Refined potash	5 „

Colour with tincture of chlorophyll.

Vegetable Syringa Lotion

Alcohol, 95 per cent.	2 litres
Water	80 c.c.
Tincture of vanillin	200 grams
Terpineol	10 „
Oil of geranium	1 gram
„ cananga	1 „
Tincture of cantharides	20 grams
Heliotropin	2 „

• *Skin Lotion*

Alcohol, 95 per cent.	2 litres
Distilled water	50 c.c.
Glycerine	115 grams
Tincture of cantharides	40 "
Oil of bergamot	15 "
" lavender	2 "
" lemon	10 "
" neroli	5 "
" bitter orange	4 "
" cananga	10 "

Hair restorer Lotion, to prevent hair coming out

Alcohol, 95 per cent.	2 litres
Castor oil	250 grams
Infusion of benzoin	250 "
" chloral	50 "
Powdered tannin	50 "
Resorcin	20 "
Tincture of vanilla	100 "

• *Vegetable Lotion of Nice Violets* •

Alcohol	2 litres
Infusion of violet, 11	800 grams
" violet, 11	200 "
" orange, 11	200 "
" jasmine, 11	200 "
" benzoin	10 "
Tincture of musk, 11	30 "
Violeto-ne	2.5 "
Iralia	1.5 "
Oil of bergamot	10 "
Glycerine	100 "
Rose water	1 l. 500 c.c.

Petrol Lotion

Alcohol, 90 per cent.	5 litres
Petroleum ether	125 grams
Decoction of saponaria roots	1000 "
Linalol	20 "
Oil of lavender	15 "
" bergamot	10 "
isoSafrole	5 "
Water	1 l. 500 c.c.

• *Another Formula*

Alcohol	2 l. 500 c.c.
Petrol	1 l. 500 c.c.
Rose-water	1 litre
Oil of bergamot	15 grams
" lemon	10 "
" sweet orange	10 "
Geraniol	10 "
Oil of cloves	3 "

Redistilled Petrol Ether, Perfumed (C'erbelaud)

Take 1 litre of redistilled petroleum ether, as odourless as possible, and perfume with :—

I. Extra fine verbena essence	2.50 grams
or	
H. Essence of rose d'Orient	0.50 gram
or	
III. Oil of bergamot	2 grams
" cedrat	1 gram
" neroli	0.50 "
" Manilla ylang-ylang	0.50 "
" verbena	0.10 "
" rose d'Orient	0.10 "

Mix away from a flame and filter through paper. Make up to 1 litre by adding petroleum ether to replace evaporation losses.

Eau de Boileau Lotion

Alcohol, 96 per cent.	1 litre
Water	250 grams
Tincture of cantharides	13 "
Salicylic acid	13 "
Glycerine	50 "
Oil of birch	20 "
" bergamot	15 "
" geranium	3 "

This lotion exercises a marked influence on the growth of the hair. In preparing, dissolve the perfumes in the alcohol, adding the salicylic acid, tincture of cantharides and finally mix with the water and the glycerine. Colour green with chlorophyll.

Imitation "Xour" Lotion (C'erbelaud)

Formaldehyde, 40 per cent.	2-3 grams
Tincture of saffron, 01 per cent.	1 gram
Carbonate of potash	2 grams
Terpinol	2 "
Distilled water	1000 "

This lotion is used as a skin cure.

Ammonia Lotion (Gattefossé)

Sulphuricinate of ammonia	175 grams
Terpenoless oils (to taste)	3 "
Extract of cinchona	20 "
Ammonia, 20 per cent.	20 "

Mix above with about 800 c.c. of water.

Ammonia Water for the Skin (American)

Ammonia	20 grams
Sea-salt	35 "
Camphorated alcohol	3 "

Add the alcohol, then the ammonia, to the salt water. Tinge with green with a basic aniline colour.

Skin Cure (Cerbelaud)

Borax	400 grams
Bicarbonate of soda	400 "
Terpinol	1 gram

Dissolve a spoonful in a glass of warm water when using.

New-mown Hay Lotion (Cerbelaud)

Orange-flower water	1000 grams
Rose-water	3500 "
Alcohol, 90 per cent.	4000 "
Powdered coumarin	100 "
Vanillin	2 "
Ionone or violetal	1 gram
Benzyl acetate (or synthetic jasmine)	5 grams
Solution of artificial musk, 7 per cent.	500 "
Essence of Alpine lavender	6 "

For a better and finer product, in place of distilled water use tinctures of orris and tonquin beans.

Soap Lotion

White Marseilles soap	115 grams
Water	170 "
Glycerine	160 "
Lavender oil	5 drops
Oil of bergamot	10 "

Cut the soap into cubes, add the water, and place in a water-bath and add if necessary 15 grams of caustic potash. Leave to cool and whilst still lukewarm add the glycerine and perfumes. A more simple formula of Gattefossé's is:—

Pure soap	250 grams
Glycerine	250 "

Dissolve in water, warming to complete the solution. If distilled water is used the product is clear but cloudy with ordinary water. If preferred, alcohol may be used to prepare a resin soap:—

Rosin	100 grams
Solution of carbonate of soda, 10 per cent.	900 "

Mix and warm till completely dissolved.

Euresol Hair Lotion

Alcohol, 95 per cent.	7 litres
Distilled water	1 litre
Euresol	250 grams
Artificial oil of neroli	20 "
Oil of geranium	20 "
" cananga	15 "
" bergamot	25 "

Euresol is mono-acetate of resorcin, and can be used in place of the latter in all cases. It is very soluble in alcohol, which is useful from the point of view of the perfumer, as it does not irritate the skin, nor does it alter the natural colour of the hair. Appended is a formula for *euresol* lotion using castor oil :—

Euresol Lotion with Castor Oil

Alcohol, 95 per cent.	7 litres
Distilled water	500 c.c.
Castor oil	600 c.c.
Euresol	300 grams
Carnation	30 "
Terpineol	45 "
Hawthorn	10 "
Artificial oil of geranium	15 "

Camomile Lotion

Alcohol	10 litres
Orange-flower water	3 "
Extract of camomile	200 grams
Oil of camomile	180 "
" geranium	30 "
Ionono	5 "
Oil of cloves	10 "
" bergamot	100 "

Extract of camomile is prepared with :—

Alcohol, 50 per cent.	10 litres
Camomiles, finely cut up	1 kilo.

Place the materials in a vessel and stir for twenty-four hours. Then filter through linen and press out the residue. Place the whole in a vessel and evaporate. By this means 22 to 28 per cent. of extract is obtained.

Nettle Lotion

The stinging-nettle contains a glucoside which assists the growth of the hair. Here is a formula for nettle lotion :—

Infusion of nettle	5 litres
Rose-water	1 litre
Balsam of Peru	180 grams
Artificial oil of geranium	25 "
" " bergamot	40 "
Heliotropin	25 "
Tincture of musk	100 "

Infusion of nettle is made thus :—

Stem of common nettle	1 kilog.
Alcohol	2 litres

Chop up the stems finely and immerse in warm 30 per cent. alcohol. Place in an agitator and stir for three days, when the infusion is ready for use. Then press out and filter on an ordinary filter-paper.

Bath Requisites

Bath requisites are generally composed of alkaline carbonate to which has been added soap, saponin, and perfume. Concentrated mixtures, which are to be diluted on use, are employed.

Bath Crystals.—Like smelling salts, bath salts are usually made of regular crystals (twice sifted) of carbonate of soda and sulphate of soda, with the optional addition of alum, and scented with 5 to 10 grams per kilog. of an appropriate perfume (violet for preference).

Powdered bath salts are composed of powdered carbonate or bicarbonate of soda, and sometimes of sea-salt. Sulphur baths need not be discussed here.

The different varieties of pine essences give balsamic, aromatic, toxic, and anti-asthmatic baths. Essences of lavender, myrtle, cyprus, eucalyptus, and rosemary are also to be recommended for hygienic baths. Borax, perborate of soda, and trioxymethylene may also be used. Gattefossé recommends the following formula :—

Bicarbonate of soda	700 grams
Soap powder	200 "
Alum	20 "
Perborate of soda	20 "
Trioxymethylene	10 "
Essence of lavender	50 "

Bath Salts (Verbelaud).—Under this name in commerce various products are included which are easy to imitate by adding various perfumes to carbonate of soda. Mix in a mortar and pass through a horsehair sieve. The amounts of perfume are per kilog. of soda.

	1.	2.	3.	4.
Oil of lavender	5 grams	10 grams	—	—
" verberna	—	—	10 grams	—
Amyl salicylate	—	—	—	5 grams
Artificial musk	—	25 grams	—	—
Coumarin	—	25 "	—	—

Vichy-Etat bath alkali is perfectly imitated by using pure bicarbonate of soda.

Softening Powder for Baths

	Extra.	Prima.	Ordinary
Oatmeal flour	3 kilos.	5 kilos.	10 kilos.
Bran	1 kilo.	5 „	10 „
Almond	1 „	5 „	—
Wheat	1 „	3 „	4 kilos.
Soap powder	1 „	1 kilo.	—
Oil of bergamot	70 grams	150 grams	100 grams
„ neroli	10 „	—	—
„ cedrat	20 „	—	20 grams.
„ cloves	20 „	—	—

Detergent for Baths (Ferville)

Saponin	1 gram
Soap	5 grams
Alcohol (to dissolve the soap)	5 „
Caustic soda lye	0.5 gram
Ammonia	250 grams
Water	750 „

This product is very cleansing when added to soapy water, as it is equally good to clean woollens, brushes, and other toilet objects.

“ Milk ” Bath (Verbelaud)

Cascin	100 grams
Bicarbonate of soda	800 „
Carbonate of soda	100 „
Coumarin	1 gram
Bouvardia	0.5 „

Triturate in a mortar and mix well.

CHAPTER VII

CLEANSING COSMETICS (*continued*)

REQUISITES FOR THE CARE OF THE MOUTH AND TEETH

THE principal solid substance used for the hygiene of the mouth and teeth is washed precipitated chalk, with the addition of antiseptics and astringents such as: soap, borax, thiatany, camphor, cinchona, etc., and perfumed with essence of peppermint, etc. Dentifrice powders are more efficacious than waters, for they clean the teeth better, owing to the friction which they set up, than a simple rinsing of the mouth. But with certain powders the friction is inclined to scratch the enamel of the teeth—such powders as punice, cuttle, tale, infusorial earth. These products must be rigorously avoided in the manufacture of dentifrice powders, unless very finely powdered. Powdered wood charcoal is out of fashion as a dentifrice, and its use is absurd from both the hygienic and the æsthetic points of view. The same can be said of certain older dentifrices upon which antiquity hardly confers the claim to be perennial.

Equally to be avoided are certain powders with bases of grey or red cultivated cinchona barks, as the bark often contains grains of sand and is generally rich in silica. Wild Calisayan cinchona and royal yellow wild cinchona in fine powder are the only kinds to be recommended.

Dentifrice pastes, of greater or less consistency, are prepared with powder and glycerine, syrup, or soap. The use of dentifrice washes has as its chief object the destruction of the bacteria which are found in the mouth, and thus to ensure the preservation of the teeth. Dr. Rose of Germany has devoted himself to the study of parasites of vegetable origin which live in the mouth, and he has established a method of controlling the bactericidal power of dentifrice washes. As a result of his experience he states that the number of germs contained in an average wash from the mouth varies between 10 and 800 millions; in the morning the number is greater and during the day less, since many of the bacteria retire to the digestive organs with food and

drink. The healthier the teeth and the better the muscles of mastication the more bacteria are carried to the digestive organs.

The parasitic germs of the mouth can only be destroyed by a strong antiseptic, but it must be one which attacks neither the enamel, as do all acids, nor the tissues of the mouth, as do the alkalis. Dr. Rose has tested the usual dentifrice washes and draws some interesting conclusions. He states that a solution of kitchen salt warmed to blood heat can kill many bacteria. Formaldehyde, much advertised as a disinfectant, has given practically negative results. Besides, the latter attacks the mouth tissues and decomposes rapidly.

It is upon alcohol that the most important part in the preparation of dentifrice waters has fallen. According to Dr. Barsikow, the bactericidal action of alcohol is in inverse ratio to its strength. Thus pure alcohol is useless, but its disinfectant power increases with its degree of dilution; it arrives at its maximum power at 55 per cent., and after that decreases as it is further diluted.

When Dr. Koch affirmed that alcohol destroyed the bactericidal power of certain disinfectants, he was right in confining his remarks to pure or highly concentrated alcohol. Epstein's experiments with carbol, lysol, thymol, etc., in solutions of water and of alcohol of various strengths have shown that 50 per cent. alcohol gives better results than any other diluent, be it water or weak alcohol.

Analogous results have been obtained with glycerine as the solvent.

Essential Oils.	Necessary Percentage.	
	To hinder decay.	To hinder decay.
Eugenol	0.01	—
Cinnamic aldehyde	0.01	0.01
Vapillin	0.01	0.1
Salicylic aldehyde	0.1	0.1
Heliotropin	0.1	0.1
Coumarin	0.1	0.1
Thymol	0.1	—
Oil of thyme	1 : 1,500	—
Carvol	0.05	0.05
Carvacrol	—	—
Oil of lavender	very powerful	very powerful
„ peppermint	1 : 33,000	—
Menthol	0.02	—
Oil of turpentine	1 : 50,000	—
„ eucalyptus	very antiseptic	very antiseptic

Besides alcohol, the essential oils used possess certain disinfectant powers, as the above table shows. Thus it can be seen that there are numerous and varied disinfectants at hand for the preparation of dentifrices. It should not be forgotten that there are useful as well as useless organisms in the mouth—and all may be destroyed together!

LIQUID DENTIFRICES

The formulæ for liquid dentifrices are very numerous, but the ingredients vary only a little. The best known brands of this type of product are Eau de Vian, odol, cosmine, Eau du Dr. Pierre, stomatol, etc. All liquid dentifrices are perfumed with various alcoholic solutions of essences, amongst which essence of peppermint occupies pride of place, followed by essence of cinnamon, fennel, aniseed, cloves, etc.. Most of these waters are coloured, but the colouring is of no cleansing value. The public demands that liquid dentifrice should become cloudy in water, and this is easily brought about by the addition of a little solution of myrrh, or by the use of a little soap, which causes the essential oils to form a milky emulsion when the liquid is poured into water.

Cinchona Dentifrice

Alcohol, 95 per cent.	20 litres
Aniseed	1 kilog.
Cinnamon	350 grams
Cloves	320 "
Cinchona	90 "
Oil of peppermint	200 "
Cochineal	125 "

Macerate for fifteen days and filter; then add oil of peppermint and colour.

Elixir Dentifrice, No. 1

Alcohol	6 litres
Infusion of jasmine, 1	500 grams
" orange, 1	500 "
" peppermint, 1	1 litre
" pyrethrum, 1	500 grams
" aniseed, 1	500 "
Oil of peppermint	4 "
" rose	20 "
" cinnamon	1 gram
" Russian aniseed	1 "
" cloves	1 "

Reduce to 78 per cent. alcoholic strength with rose-water.

Elixir Dentifrice, No. 2

Alcohol	10 litres
Oil of cloves	55 grams
„ aniseed	47 „
„ peppermint	40 „
„ citronella	8 „
Infusion of pyrethrum	500 „

Colour red with archil, and reduce to 70 per cent. alcoholic strength with distilled water.

Dr. Pierre's Dentifrice Water

Alcohol	3 l. 500 c.c.
Cochineal	50 grains
Star aniseed	450 „

Macerate for fifteen days and then filter. Add:—

Oil of aniseed	120 grams
„ English peppermint	40 „
Heliotropin	2 „

Make in all 4 litres: let stand for three or four weeks and then filter.

Bennet's Liquid Dentifrice

Dentifrices prepared with quillaya bark do not attack the teeth:—

Bark of Panama quillaya, roughly powdered	200 grams
Glycerine	200 „
Dilute alcohol	2 litres
Oil of gaultheria	10 grams
„ peppermint	20 „

Macerate the bark in glycerine and 1 litre of dilute alcohol, and add the perfuming oils; let stand for twenty-four hours, stirring occasionally; filter, and add the rest of the alcohol to complete.

Meyer's Liquid Dentifrice

Powdered quillaya	50 parts
Peppermint water	300 „
Alcohol	300 „

Macerate for a few days and add:—

Powdered cochineal	1 part
Peppermint water	100 parts
Glycerine	100 „
Oil of gaultheria	1.5 „

After a day of occasional stirring make up to 1000 parts with peppermint water and filter.

Antiseptic for the Mouth

Thymol	1 part
Benzoic acid	12 parts
Tincture of eucalyptus	48 "
Water	3,200 "

Thymol Liquid Dentifrice

Thymol	3 grams
Infusion of horse-radish	300 "
" melissa	300 "
Tincture of rhatany	100 "
Oil of peppermint	15 "
" cloves	10 "

Thymol Liquid Dentifrice (Dr. Muller)

Thymol	2 gr. 500 c.c.
Tincture of eucalyptus	150 grams
Alcohol, 95 per cent.	1 litre
Oil of gaultheria	10 grams

Thymol and Borax Liquid Dentifrice

Thymol	1 gram
Borax	2 grams
Rose-water	1 litre

Vigier's Hygienic Alkaline Water

Rose-water	1 gram
Carbonate of soda	20 litres
Infusion of peppermint	200 "
Oil of English peppermint	20 "

with 5 grams of carbonate of magnesia.

The water is added to infusion of peppermint and the carbonate of soda is then dissolved in it. Carbonate of magnesia absorbs all the oil of peppermint, is rubbed with it to a cream, and then poured into the alkaline solution. Filter after five days.

Dr. Monin's Liquid Alkaline Dentifrice

For 1 litre of water:—

Bicarbonate of soda	20 grams
Carbonate of magnesia	2 "
Tincture of peppermint	20 "
Oil of peppermint	1 gram

Quinosol Liquid Dentifrice

Alcohol, 90 per cent.	6 litres
Quinosol	4 grams
Oil of Ceylon cinnamon	5 "
" Mitcham peppermint	60 "
Infusion of benzoin	200 "
Distilled water	2 litres
Tincture of cochineal	100 grams

Salol Liquid Dentifrice

Alcohol, 90 per cent.	15 litres
Salol	300 grams
Oil of aniseed.....	50 "
„ geranium	50 "
„ peppermint	2 "

American Liquid Dentifrice

Alcohol, 90 per cent.	1 litre
Thymol	5 grams
Glycerine	300 "
Carbolic acid crystals	2 "
Safrole	2 "
Geraniol	4 "
Oil of eucalyptus	6 "
Carvacrol	5 "
Water	250 "

Peppermint Alcohol

Peppermint alcohol is both a liquid dentifrice, a mouth-wash, and a refreshing wash. It is prepared with alcohol and oil of peppermint of the very highest quality, such as the Mitcham variety.

Alcohol, 95 per cent.	4 litres
Oil of Mitcham peppermint.....	40 grams

Oxygenated Liquid Dentifrice

Distilled water	1 litre
Peroxide of hydrogen, 30 volumes	30 grams
Oil of aniseed.....	3 "
Alcohol	850 c.c.
Oil of peppermint	15 grams

A few drops in a glass of water are sufficient.

Action of Oxygenated Water on Dentifrices

Peroxide of hydrogen is a very powerful oxidation agent, and we may assume that it acts to some extent on essential oils as well as on those which are easily oxidable (such as alcohol, aldehydes); a series of interesting tests were made in the laboratory on this question.

First Series of Experiments

To a mixture composed of 40 grams of 90 per cent. alcohol, 30 grams of water and 25 grams of peroxide of hydrogen (12 volumes), 0.05 gram of essential oil was added. The mixture was allowed to stand for two months in a well-corked bottle, and was then compared with a similar mixture newly made with a

view to discover the differences in flavour (the aroma was not comparable owing to lack of concentration). Appended are the results:—

Volatile oil used.	Remarks on mixture after two months.
Anethol	No change.
Terpeneless oil of aniseed ...	
Bornyl acetate	
Terpeneless oil of pine	Weaker than in the fresh solution.
Carvacrol	
Eucalyptol	No change.
Terpeneless oil of eucalyptus	Taste slightly altered—the fresh solution had a more pleasant taste.
Eugenol	Marked change; taste weak and stale.
Terpeneless oil of cloves	Taste weaker than in fresh solution.
Geraniol	
Terpeneless oil of Spanish geranium.	Great change in taste. No refreshing menthol taste at all.
Menthol	Great change. Taste quite lost.
Menthyl acetate	Same as menthol.
Oil of peppermint (all kinds)	Taste a little weaker than in fresh solution.
Terpineol	No change.
Thymol	Completely oxidised; taste disappeared—no trace of cinnamon apparent.
Cinnamic aldehyde	

Second Series of Experiments

To a mixture composed of 40 grains of 90 per cent. alcohol, 30 grams of water and 25 grams of hydrogen peroxide (12 vols.), 0.05 gram of aromatic product was added. After about three weeks this was compared for differences in taste with a like mixture freshly prepared.

Aroma used.	Remarks.
Natural lemon oil	Perfume stale and soapy.
.. sweet orange oil	Less change than lemon—taste a little weaker.
.. bitter orange oil	As for sweet orange.
Maraschino	Taste weaker.
Neroli bitter orange	
Cognac	No change.
Caraway	Little change—taste a little weaker.
Vanillin	Taste quite different (sharper).
Bitter almonds	Completely oxidised in benzoic acid.
Terpeneless lemon	
.. sweet orange	Taste weaker.
Artificial orange	

These experiments show that hydrogen peroxide acts in a more energetic manner on geraniol, menthol, menthyl acetate, oil of peppermint, and in a less energetic manner on carvacrol, eugenol, oil of geranium, oil of cloves, bornyl acetate anethole, aniseed, eucalyptol, oil of eucalyptus, and thymol. It is therefore advisable, in using oxygenated water in dentifrices, only to use the last-named products, or others not easily attacked.

Stomatol Liquid Dentifrice

This liquid dentifrice and disinfectant consists essentially of a solution of terpineol, $\frac{1}{2}$ to 50 parts of alcohol, 55 to 99 parts of water, $\frac{1}{4}$ to 0.50 part of soap, and $\frac{1}{4}$ to 0.50 part of aromatic substances. To obtain a higher degree of concentration, mix 4 parts of terpineol, 42 parts of water, 45 parts of alcohol, 2 parts of soap, 5 parts of glycerine, and 2 parts of aromatics.

Odol

Dissolve in a litre of 90 per cent. alcohol :—

Salol	50 grams
Saccharine	5 „
Oil of peppermint	8 „
Tincture of vanilla, 10 per cent.....	5 „

Filter through paper after well stirring. Use a few drops in warm water. This formula gives a product similar to, though not absolutely identical with, the original formula.

Dentifrice Powders

Dentifrice powders, like all mouth preparations, must receive care in manufacture. They should be extremely finely ground, and must not contain any matter which could in any way harm the enamel of the teeth. They should not contain acids, nor should acid form in them afterwards. As they are used both to clean the teeth and to disinfect the mouth, antiseptics are added which are capable of destroying microbes in the mouth, but no toxic substances. They are perfumed with oil of peppermint and oils of cinnamon, aniseed, clove, etc.

Among the powders on the market, a certain number are absolutely harmful. Take, for example, wood charcoal well powdered and sieved; to the well-known disinfectant properties of this material is added a softness of texture which is quite incapable of attacking the enamel, yet this charcoal, however carefully it be prepared, is a bad dentifrice. It contains a small quantity of silica, and this attacks the cuticle of the tooth, uncovers the enamel, and thus allows the acid parts of the food to penetrate into the interstices of the tooth and start a decay which nothing can arrest. It need scarcely be added that emery powders, pumice, etc., are still more harmful. If there is a powder really useful in the hygiene of the teeth, it is Trojan white (calcium carbonate). A powder of this kind, coloured rose and slightly perfumed with oil of peppermint, is certainly an all-round excellent

dentifrice. Applied with a very soft brush or, better, with a fine small sponge, it can render such hygienic services as one would expect. We shall not give many recipes for this type of preparation. The following is a general formula, which will serve as a base for all dentifrice powders. Antiseptics and perfumes must be added to taste:—

Dentifrice Powder, General

Carbonate of lime, precipitated (passed through 120 sieve)	7.500 kilos.
Carbonate of magnesia.....	3 "
Powdered orris root	1.500 "
Cream of tartar	750 grams
Sugar	1.500 kilos.
Alum	750 grams

Reduce to a fine powder.

Perfume, General Formula

Oil of peppermint	250 grams
Anethole	120 "
isoEugenol	50 "
Oil of cassia	40 "
.. bergamot	40 "
Tincture of myrrh.....	150 "

Four to 5 grams of this mixture are enough to perfume 1 kilo. of the powder.

Cinchona Dentifrice Powder

General formula powder mixture	3 kilos.
Finely powdered cinchona bark	2 "
Artificial rose essence	2 grams
isoEugenol	2 "
Anethole	2 "
Oil of cinnamon	2 "
Tincture of myrrh.....	10 "
Oil of eucalyptus	1 gram

Apodontoll

General formula mixture	3 kilos.
Oil of rose	1 gram
.. bergamot	5 grams
.. cloves	1 gram
.. sweet orange	2 grams
.. artificial neroli	1 gram
.. ylang-ylang	0.2 "

Camphorated Chalk

General formula mixture	3 kilos.
Camphor dissolved in alcohol	25 grams
Eucalyptol	2 "

Carbol Dentifrice Powder

Precipitated chalk	3 kilos.
Lactose	2 "
Cream of tartar	1.300 kilos
Artificial oil of rose	2 grams
Oil of geranium	15 "
Carbolic acid	80 "

Rose Dentifrice Powder

Precipitated chalk	1-100 kilo.
Powdered orris root	150 grams
Bicarbonate of soda	30 „
Sulphate of quinine	5 „
Otto of rose	0.5 gram.

Salol Dentifrice Powder

Carbonate of lime, precipitated	500 grams
Carbonate of magnesia	500 „
Bicarbonate of soda	50 „
Phosphato of lime	500 „
Salol	10 „
Oil of peppermint	14 „
Anethole	3 „

Quinosol Dentifrice Powder

Precipitated chalk	4 kilos.
Powdered orris root	2 „
Quinosol	10 grams
Oil of geranium	30 „
„ cloves	2 „
„ sandalwood	5 „
„ cinnamon	1 gram

Ideal Dentifrice Powder

Powdered mastic	250 grams
Bicarbonate of soda	500 „
Carbonate of precipitated chalk	3-800 kilos.
„ magnesia	2-500 „
Salicylic acid	100 grams
Oil of peppermint	50 „
Anethole	10 „

Milling Mixer

The granite mill stone revolves in a cupola (Fig. 12) and is followed by a scraper which removes the milled material. Ratchets turning with the mill stone throw under it the pieces picked up round the edges. A worm and cog winder drive the mill by a vertical axle passing down the centre.

DENTIFRICE SOAPS AND PASTES

Dentifrice soaps are prepared as follows :—

Warm 6 parts of caustic soda lye (36° Bé.) and pour in 100 parts of olive oil, stirring continually till saponification is complete. Then dissolve the soap in 300 parts of distilled water and add 25 parts of cooking salt dissolved in 75 parts of distilled water, stir the whole time and heat to the boil till the soap separates on the surface. Leave to cool, wash the soap in distilled water,

dissolve in 60 parts of distilled water so as to obtain a uniform mass which is poured into a mould lined with damp linen; after cooling cut the soap into pieces and dry in a moderately warm place. Carbonate of lime (precipitated) or calcined magnesia is added to this soap, and it is coloured with carmine, chlorophyll, or tincture of cutch. Proceed as follows:—

Powder 1 kilo. of soap and mix 250 grams of glycerine and 500 grams of 90 per cent. alcohol; then add carbonate of lime in sufficient quantity to obtain a thick mass. Perfume and colouring

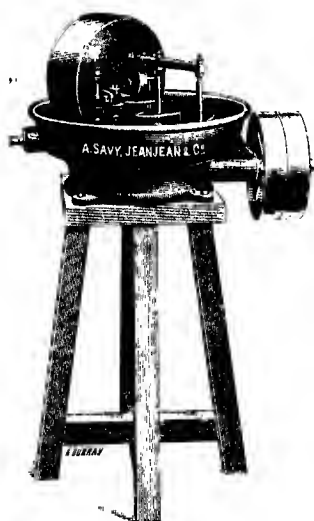


FIG. 12.—Powder Mixing Mill.

are added with the alcohol. The following perfume may be used for the above amount of soap:—

Oil of peppermint	20 grams
„ cloves	5 „
„ lemon	5 „
Infusion of benzoin	10 „

The dentifrice soap just described is rather expensive. The manufacture is simplified by the use of Marseilles soap as follows:

Marseilles soap	500 grams
Carbonate of lime	500 „
Powdered orris root	500 „
Sugar	250 „
Rose-water	250 „
Oil of peppermint	10 „
„ cloves	10 „
Anethole	5 „

Dissolve the soap, cut into pieces in water, add rose-water, triturate together the essences, sugar, powdered orris, and carbonate of lime, and mix well with the rest of the ingredients.

Another Formula

Fine white soap.....	1 kilo.
Carbonate of lime	1 ..
Glycerine	1 ..
Powdered orris	500 grams
Oil of peppermint	10 ..
Anethole	5 ..

Colour with carmine.

English Dentifrice Soap

Marseilles soap	500 grams
Carbonate of lime	500 ..
Powdered orris root	500 ..
Sugar	250 ..
Rose-water	250 ..
Oil of peppermint	10 ..
.. cloves	10 ..
Anethole	5 ..

Dissolve the soap in water, add rose-water, mix the oils with the sugar, orris root, and carbonate of lime, and mix all together until of uniform consistency.

DENTIFRICE PASTES

Dentifrice paste differs from dentifrice soap in that it contains less soap.

Honey	500 grams
Powdered soap	500 ..
Magnesia	275 ..
Water	15 ..
Oil of peppermint	15 ..
Carmin	1 gram
Ammonia	q.s.

Triturate the honey, powdered soap, and magnesia to make a thick paste, then incorporate the carmine with the water and ammonia. Only ammonia sufficient to dissolve the carmine must be used.

Thymol Dentifrice Paste

Take the above base and add :—

Thymol	20 grams
Oil of peppermint	10 ..
.. rose-wood	5 ..
Commurin	0.1 gram

Salol Dentifrice Paste

Take the above base and add :—

Salol	50 grams
Oil of peppermint	10 „
„ cloves	5 „
„ rose	1 gram
„ neroli	1 „
Anethole	2 grams

Cherry Tooth Paste.

Take above base and add :

Oil of cinnamon	5 grams
Anethole	8 „
Oil of cloves	4 „
„ bergamot	4 „

Odontine

Carbonate of lime	600 grams
Powdered rice-starch	200 „
Powdered soap	25 „
Powdered orris root	20 „
Carmine	1 gram
Ammonia	2 grams
Water	8 „
Glycerine	10 „
Syrup	50 „
Oil of peppermint	15 „
„ eucalyptus	2 „
Eugenol ..	2 „

Reduce to a uniform paste with rose-water.

Odontalgic Paste

Honey ..	415 grams
Glycerine	415 „
Carbonate of lime	3 kilos.
Oil of peppermint	7 grams
„ aniseed.....	4 „

Place the honey in a water-bath, add glycerine, pour the whole into a marble mortar previously warmed, mix the whole, and colour with carmine. Then add small portions of the chalk and when the mass has become fairly pasty, take a small quantity and beat in a mortar till the paste becomes soft.

Hygienic Dentifrice Paste

Glycerine	1 kilo.
Carbonate of lime	3 kilos.
Talc	500 grams
Bicarbonate of soda	500 „
Tannin (dissolved in alcohol)	5 „
Oil of peppermint	10 „

DENTIFRICE CREAMS

Dentifrice creams are nothing more than dentifrice pastes reduced to a cream by the addition of glycerine and water. They are generally put up in tubes.

Dentaline

Precipitated chalk	1000 grams
Glycerine	1500 "
Powdered soap	700 "
Oil of peppermint	50 "
" lavender	10 "
Thymol	15 "
Menthol	15 "

Chlorate of Potash Dental Cream

Finely powdered chlorate of potash	500 grams
Glycerine	940 "
Powdered soap	120 "
Soap cream	250 "
Carbonate of lime	1000 "
Oil of peppermint	30 "
Anethole	3 "
Oil of cinnamon	5 "
" lavender	2 "

Do not colour, as chlorate of potash will discharge most red colours.

Quinosol Dental Cream

Carbonate of lime	1 kilo.
" magnesia	1 "
Powdered soap	200 grams
Glycerine	600 "
Tincture of cochineal	100 "
Quinosol	5 "
Oil of peppermint	25 "

Cachou Pastilles for Smokers (to eliminate the odour of tobacco)

Gum arabic	1 kilo.
Sugar	3 "
Tartaric acid	10 grams

Triturate the above with water to a thick paste. Perfume with :—

Oil of rose	5 grams
" verbena	1 gram
Civet	5 grams
Musk	10 "

Dissolve in 20 grams of alcohol; add the solution to the paste, and powder again to mix well. Then shape into small pastilles. These dissolve in the mouth as sweets and perfume the breath.

CHAPTER VIII

SOFTENING COSMETICS

BEAUTY CREAMS

UNDER the names of creams, cold creams, glycerines, etc., are included a whole series of mixtures employed for softening the skin, for fixing rice and starch powders, or for application to the skin for medicinal purposes.

Greasy creams are mixtures of glycerides or hydrocarbon oils of the consistency of glycerine.

Cold creams or emulsion creams can be made from fats or from thinner materials, which are liquefied in mixing, whilst warm, with sufficient aromatic waters. Soap-creams are emulsions of fatty matter more or less saponified, with which are incorporated softening and perfumed materials. This type of product is very stable.

Jellies are prepared with water and gums or gelatine, glycerine, perfumes, etc.

Starchy creams are mixtures of starch and glycerine with which are incorporated antiseptics, perfumes, and various other ingredients.

"Toilet milks" or "Lait Virginal," must be added to this category of products. This type of preparation is always in favour and deserves its popularity. Virginal milks excite the skin and stimulate the circulation; they are to be recommended for dry skins to prevent blackheads, etc.; but their action is a little irritating, and small quantities only must be used. The chief ingredients in the preparation of creams are almond oil, olive oil, and arachis oil, tallow, lanoline, cocoa-butter, petroleum jelly, beeswax, spermaceti, glycerine, etc. Fatty mustard oil also gives excellent results, for it possesses a greater viscosity than olive oil. Beeswax is one of the most important ingredients. Dr. Seheich has invented a method of emulsifying wax in water, which is as follows:—

Place in a water-bath 1 kilo. of beeswax, melt, then remove

from the bath and pour in, drop by drop, 100 grams of ammonia. Then add boiling water to form a thick paste. Place back in the water-bath and stir to a liquid mass of uniform consistency, clear white or yellow, soluble in water and not gritty. If unsuccessful, it is only necessary to add a little more ammonia.

FATTY CREAMS

To prepare these creams use plenty of petroleum jelly, modifying the consistency by the addition of either fluids or solids. The following are a number of formulæ :—

Petroleum Jelly Cream

White petroleum jelly	500 grams
White wax	500 "
Spermaceti	50 "
Boric water (50 grams per litre)	150 "
Oil of bergamot	10 "
" orris	1 gram

To the mixture of fatty matter slightly warmed add previously warmed water of the same temperature, in order to prevent the wax precipitating; then add the perfumes.

Another Formula for Petroleum Jelly Cream (Labonne)

	Rose.	Heliotrope.	Lily of the valley.
Petroleum jelly	250 grams	300 grams	300 grams
Ceresine	150 "	—	—
Beeswax	2 "	30 grams	50 grams
Oils of {	geranium	—	1 gram
	linaloe	—	1 "
	neroli	1 gram	—
	rose	5 drops	—
	cassie	—	2 drops
	heliotrope (artificial)	—	2 "
bergamot	—	—	10 drops

Lanoline Cream

Lanoline	500 grams
Almond oil	500 "
Rose-water	500 "
White wax	100 "
Vaillin	15 "
Terpineol	10 "

Another Formula (Cerbelaud).

	I.	II.	III.
Anhydrous lanoline	125 grams	280 grams	200 grams
White petroleum jelly	—	—	200 "
Distilled rose-water	10 grams	120 grams	200 "
" witch hazel water	65 "	—	—
Oil of verbena	—	1 gram	—
" rose geranium	—	—	1 gram
" cedrat	—	1 gram	—

Warm the fatty substances and add the perfumes, stirring the mass in a mortar until cold.

These creams are usually sold in tubes, and are used for removing wrinkles, rash, soothing after shaving, etc. They have almost entirely replaced the older mixtures with glyceride bases which are liable to turn rancid:

Glycerine Cream

Almond oil	2 kilos.
Glycerine	250 grams
Soap cream	160 "
Oil of geranium	35 "

Mix the soap and glycerine well together, then slowly add the almond oil to which is added the oil of geranium.

Another Formula

Oil of sweet almonds	500 grams
Glycerine	75 "
White wax	30 "
Marseilles soap	15 "
Oil of thyme	5 "
" bergamot	5 "
" neroli	2 "

Dissolve the soap in the glycerine, and mix with the almond oil and wax to a uniform paste; then add the perfumes.

Another Formula

Oil of sweet almonds	1 kilo.
Spermaceti	300 grams
White wax	75 "
Glycerine	175 "
Oil of bergamot	10 "
" neroli	1 gram

Another Formula

Glycerine	300 grams
Water	300 "
Gum (tragacanth)	10 "

Place the gum in water and stir from time to time to a uniform jelly, then add the glycerine. The gum must be quite pure. Perfume with a few drops of oil of bergamot.

Another Formula (Willmarck)

Lanoline	10 grams
Petroleum jelly	40 "
Glycerine	50 "
Chalk	50 "
Alcohol	30 "

Alcohol here is used to keep the mixture liquid.

Sulphur and Oxide of Zinc Cream

Lanoline	50 grams
Oil of sweet almonds	50 "
Precipitated sulphur.....	50 "
Oxide of zinc	25 "
Extract of violet	5 "

Colour rose.

Vanilla Cream

Balsam of Peru	20 grams
Oil of almonds	100 "
Hog's lard	100 "
Vanillin.....	5 "

Mix the balsam and the oil, adding the hog's lard little by little.

Cream Lotion for Red Hands (Monin)

Lanoline	10 grams
Paraffin.....	25 "
Vanillin.....	0.1 gram
Oil of roses	0.05 "

Mix the lanoline and the paraffin, and perfume.

COLD CREAMS

True cold creams, with a base of wax, spermacetti, cocoa butter, almond oil, etc., in emulsion form in glycerined rose-water or otherwise are now hardly used, owing to difficulty of preservation. These products have been replaced either by stearate creams, petroleum jellies and lanolines, by starchy glycerines, or by gelatine soap pastes. Further, the classic method of preparing cold creams has been simplified by adding mucilaginous matters, such as gum tragacanth, water, and gelatine; a little soap (2 per cent.) is also often incorporated. Lastly, to ensure the preservation of the products, 1 per cent. of salicylic acid is added and also glycerine in considerable quantities.

Following are the old formulæ for cold creams. By altering them as we have just pointed out, the products are preserved in a state fit for export.

Cold Cream

Oil of sweet almonds	1 kilo.
Spermaceti	150 grams
White wax	150 "
Rose-water	1 litre

Warm the fatty bodies on a water bath; warm the rose-water and add it in small quantities, stirring all the time. The rose-water may be replaced by glycerine.

Another Formula

Oil of sweet almonds	1 kilo.
White wax	60 grams
Spermaceti	100 "
Rose-water	300 "
Castor oil	10 "
Oil of roses	2 "
" geranium	2 "
" bergamot	10 "

Mix the wax and spermaceti in a water-bath, then add the almond oil, leaving the whole in the water-bath. Next add the castor oil, then the rose-water, stirring continually, finally perfume and place in jars. A trace of methyl violet may be added to ensure that the preparation retains its whiteness.

Cold Cream for the Theatre

Oil of sweet almonds	600 grams
Cocoa butter	900 "
White paraffin	200 "
Lanoline	60 "
White wax	80 "
Spermaceti	80 "
Powdered borax	40 "
Rose-water	750 "
Terpineol	40 "

Violet Cold Cream

Olive oil	500 grams
White wax	50 "
Spermaceti	50 "
Distilled water	50 c.c.
Ionone	5 grams

Other Cold Cream Formula (C'erbelaud)

	Extra fine.	Fine.	Glycerine.
Spermaceti	160 grams	100 grams	90 grams
White wax	80 "	50 "	90 "
Oil of sweet almonds	560 grams	—	570 "
Oil of peach kernels	—	600 grams	—
Distilled rose-water	180 grams	200 "	—
Peppermint water	—	50 "	—
Glycerine, 30 per cent.	—	—	250 grams

Perfumes :

Artificial musk	0.10 gram	0.10 gram	0.20 gram
Powdered menthol crystals	—	—	0.25 "
Extract of milk-fleurs or heliotrope ...	5 grams	5 grams	—
Powdered vanillin crystals	—	—	0.50 gram
Oil of bergamot	1 gram	1 gram	—
" rose geranium	1 "	1 "	2.50 grams
Tincture of civet	—	—	1 gram
" lavender	1 gram	1 gram	—
" bitter almonds	2 drops	2 drops	0.50 gram
" petitgrain	1 gram	1 gram	—
" cloves	—	—	0.25 gram

Warm the mixture in a water-bath, then, when the mass is liquefied, pour into a porcelain mortar warmed with boiling water, and stir without ceasing until it becomes a paste. Add the perfume slowly until completely cool. The glycerine base formula is recommended. The process of manufacture occupies little more than half an hour.

Petroleum Jelly Cold Cream (Terville)

Petroleum oil	600 grams
White wax	60 "
Paraffin.....	140 "
Eau de Cologne	30 "
Water	200 "
Rose-water	200 "
Tincture of benzoin	10 "
Oil of rose geranium	6 drops

Mix the solid matter in the warm oils and pour into the mixture little by little, stirring at the same time, the Eau de Cologne and the perfumes. Stir well to obtain a perfectly white mixture.

Lanoline Cream (American)

Anhydrous lanoline	120 grams
Petroleum oil	60 "
Yellow petroleum jelly	60 "
Water	60 "
Oil of bergamot	10 "
" wintergreen or ionone	5 "
" ylang-ylang	20 drops

Mix the fatty materials on a water bath, add water, and stir well, perfume and put in jars.

Cold Cream (non-separating)

White petroleum jelly	500 grams
White wax	500 "
Spermaceti	50 "

Mix in a water-bath, then add little by little 150 grams of warm boric water (50 grams per litre). Remove from the bath and add 10 grams of oil of bergamot and 1 gram of oil of orris root.

Cucumber Cold Cream

This is prepared as a well-known pharmaceutical product.

Cucumber pomade	500 grams
Essence of roses	2 "

If any other perfume than rose is required, use the necessary essence in the same proportion.

Another Formula (Levy)

Cucumber juice is prepared by pressing slices of the fruit, bringing to the boil, then decanting. Then incorporate the following mixture :—

Oil of sweet almonds	500 grams
Green oil.....	500 "
Cucumber juice	500 "
Wax	25 "
Spermaceti	25 "
Spirit of cucumber	50 "

Camphor Cold Cream

	Atkinson.	Piessa.
Wax	60 grams	30 grams
Spermaceti ..	60 "	30 "
Oil of almonds ..	1000 "	500 "
Camphor	130 "	50 "
Oil of rosemary	6 "	2 "
" peppermint ..	3 "	"
Rose-water	100 "	500 grams

Snow Cream

Spermaceti	100 grams
Pure wax	100 "
Oil of sweet almonds	500 "
Rose-water	50 "

Dissolve the fatty matters in a water-bath, pour the liquid into a marble vessel, and when the contents solidify stir with a pestle till uniformly white. During stirring, add 5 or 6 drops of otto of roses.

Crème du Cathay

Balsam of Mecca	0.5 gram
Oil of sweet almonds	250 grams
Spermaceti	15 "
Oxide of zinc ..	8 "
White wax	15 "
Rose-water	15 "

Crème de Cologne (Askinson)

Almond oil	100 grams
White wax ..	10 "
Spermaceti	10 "
Balsam of Mecca	20 "
Balsam of tolu	10 "
Essence of roses	40 "

• CREAMS WITH SOAP BASES

These may be prepared either by using a fully manufactured soap, or by saponifying a fatty acid, for preference stearic acid. For this purpose, the waste of best stearin candle manufacture

may be used; if it is made on a large scale, the acid should be used in the form of stearin cakes. Alkali in the form of either ammonia or caustic soda may be employed. By such means a better reaction is obtained than by the use of glycerides.

According to Cerbelaud, the following are the best quantities when using caustic soda.

Stearate of Soda Cream

Purified stearic acid	75 grams
Neutral glycerine, 30° Bé.	300 "
Distilled water	610 "
Soda lye	15 "

Dissolve the fatty body with glycerine and water; add the soda lye, stir and stop warming. When the mixture congeals, re-warm, stir till finished, and cool.

Perfume *ad lib.*

Another Formula

Pure stearic acid	600 grams
Neutral glycerine, 30° Bé.	900 "
Rose-water	1000 "
Caustic soda lye (400 grams of caustic soda ... 600 grams distilled water)	60 "
Otto of rose	1 gram
Extract of rose	10 grams
" jasmine	10 "
Solution of artificial musk (6 per thousand)	1 gram

Dissolve the fatty matter in a water-bath, then add the lye, little by little, stirring at the same time. Allow to cool, then warm again, and stir till suitably thick. After recooling, add perfumes and place in jars.

Crème mousseline (Ferville)

Stearic acid	75 grams
Glycerine	300 "
Rose-water	600 " "
Caustic soda lye, 30° Bé.	15 "

Melt the fatty matter in a water-bath, and beat it to emulsify it with air, and after removing from the bath add the caustic soda. Stir till all congeals, rewarm till liquid, and beat up energetically. Perfume and place in jars. By substituting caustic potash for the soda, softer soaps are obtained, but if the product is destined for use on the face, caustic potash is out of the question. Cerbelaud's formulæ should be followed as regards caustic soda; the least uncombined excess will produce on certain skins a disastrous effect. From this point of view the use of carbonate of soda,

recommended by Gattefossé, is preferable. The following are the proportions :—

Stearic acid	100	grams
Glycerine	330	„
Water	330	„
Carbonate of soda.....	20	„

Dissolve these ingredients, stir constantly during cooling until it becomes a paste. Perfume as desired; a good mixture is artificial rose and phenylethyl alcohol, or rose-carnation. Add infusions of the perfumes desired; benzoin and tonquin beans in the first case, musk-ambrette in the second.

The amount of carbonate of soda indicated is calculated as anhydrous carbonate; if carbonate of soda crystals are used (10 molecules of water), double the amount of carbonate. The quantity indicated in the above formula does not correspond with complete saturation of the fatty acids, for in this type of products, destined for skin cures, one must always have an excess of uncombined fatty matter, particularly to avoid the irritating effect which alkaline creams produce. In spite of that, creams of stearate are by themselves a little hard, and it is well to soften them by the addition of water and glycerine or a little weak glycerinated starch.

Stearin cream leaves few traces on the skin; to obtain a soothing cream, for whitening the skin, it is enough to add glycerine to zinc white, or, better still, spermaceti. Pure spermaceti cream leaves a thick, glossy skin, of a dusty nature; mixed with stearate cream, it gives a light pearl-white shade quite charming to see. It is enough to add, in the above formula, 20 grams of spermaceti and 350 grams of glycerine water, or more according to need.

Up to the present we have only considered stearate of soda, but stearate of ammonia appears to be more in public favour. To make soapy ammonia creams, use purified stearic acid and saponify with about 30 per cent. of 20 per cent. ammonia. But pure ammonia must be used, for when it contains pyridine derivatives it gives a soap of unpleasant odour; only ammonia should be used which, neutralised by citric acid, does not give off an unpleasant smell on boiling. In spite of this precaution, the creams present a hardly pleasant odour, due to excess of fatty acids; this must be masked by appropriate perfumes such as, artificial musk, patchouli, heliotropin, terpineol, phenyl ethyl-alcohol, benzyl acetate, oil of rose, of rose geranium, and of

bitter almonds, extract of trêfle incarnate, etc. The following are a few formulæ for this type of cream (Cerbelaud):—

Stearate of Ammonia Cream

	Unperfumed cream.	Creams similar to	
		Actra cream.	Fleur des Nèges.
Stearic acid	170 gr.	100 gr.	100 gr.
Pure ammonia, 22° Bé.	50 "	30 "	20 "
Neutral glycerine, 30° Bé.	700 "	400 "	400 "
Distilled water	80 "	—	—
Rose-water	—	455 "	455 "
Solution of cosine (1 in 100)	—	5 "	—
Linalol	—	—	10 "
Vanillin	—	—	0.1 "
Ionone	—	—	0.25 "
Musk in grains.	—	—	0.20 "
Extract of Olypre	—	25 "	—

Warm the mixture of acid, water and glycerine in a water-bath: when all is liquefied add ammonia slowly, stirring all the time. Keep in the water-bath until the product when tested with phenolphthalein gives a neutral reaction; remove from the fire, add the perfume, and stir to mix well.

Diadermine (Gattefossé).

Dissolve by gentle heat 125 grams of dry soap in 875 grams of glycerine. After cooling, a transparent liquid jelly remains which is an excellent skin emolient, for use on hair or beard.

Almond Milk Cream (American)

Rape oil soap	15 grams
Spermaceti	10 "
White wax	10 "
Glycerine	30 "
Water	150 "

Dissolve the 15 grams of soap in the 150 grams of water, add to the solution the spermaceti and the wax, melt all in a water-bath, then add the glycerine and mix well. Finally add, while stirring, a mixture of:—

Milk of almonds	300 grams
Alcohol, 90 per cent.	25 "
Oil of rose	10 drops
„ bitter almonds	5 grams
„ cloves	5 "
„ neroli	5 "

Beard Cream (Ferville)

Soap	50 grams
Rose-water	30 "
Glycerine	25 "
Alcohol	5 "
Oil of lavender	10 drops

Place the water-soap-glycerine mixture in a mortar and add the perfumed alcohol slowly, stirring the whole. For use, apply this cream on the skin instead of soap lather for shaving; this will not lather.

JELLIES

The majority of products of this kind contain as an active substance glycerine, sometimes including honey as an excipient with gelatine or gelose, the whole being perfumed according to the manufacturer's and consumer's taste. The following are formulae of this kind:—

Glycerine and Honey Jelly

Glycerine	800 grams
Honey	500 "
Gelatine	50 "
Borax	20 "
Oil of bergamot	10 "
" neroli	10 "
Rose-water	1 litre

Dissolve the gelatine, honey, and borax at a gentle heat with the glycerine and water. Perfume and place in jars.

Another Formula (Ferville).

	I.	II.
White gelatine	25 grams	4 grams
" honey	100 "	—
Glycerine	600 "	100 grams
Rose-water	—	10 "
Oil of geranium	—	5 drops
Water	270 grams	—

Jelly for the Hands (Monin)

Gelatine	7 grams
Glucose	30 "
Glycerine	180 "
Water	90 "
Oil of rose	5 drops

Jelly Cream (Cerbelaud)

Agar-agar	6 grams
Glycerine	160 "
Rose-water	240 "
Menthol	1 gram
Alcohol, 90 per cent.	4 grams

Dissolve the agar in rose-water and to the warm solution add the glycerine and mix well. After cooling, add the perfumed alcoholic solution.

Anti-wrinkle Paste (Kornhold)

Dissolve at a moderate heat 30 grams of white wax, and add, stirring well, 60 grams of juice obtained from pressing white lily bulbs, 15 grams of honey, and 12 grams of rose-water. With this unguent gently rub the affected parts of the skin every evening, and next day wipe the dressing off with a linen towel.

Anti-wrinkle Paste (Monin)

Glycerine	20 grams
Lanolin	15 "
Isinglass	5 "
Extract of rhatany	4 "
Balsam of Peru	2 "

Mix these ingredients with starch to obtain a substance of sufficient consistency. Apply at night and leave till the morning.

Anti Shaving-rash Jelly (Ferville)

Powdered gum tragacanth	10 grams
Glycerine	40 "
Rose-water	160 "
Salicylic acid	0.1 gram
Menthol	1.4 grams

Place the gum and glycerine in a mortar, add the rose-water quickly, stirring all the time, then the acid and the peppermint previously dissolved in several drops of alcohol. Apply after shaving with a piece of linen, using a very small quantity. This jelly is generally replaced by the hyalin block, the method of making which is described in the chapter on toilet soaps.

Enamel Cream (Verbeaud)

Gum tragacanth	20 grams
Jelly	10 "
Boric acid	25 "
Distilled water	500 "
Glycerine	500 "

From these materials make a uniform mixture by stirring on a water-bath, then pass through gauze. After cooling add 0.5 gram of ionone, 1 gram of oil of bergamot, 10 grams of extract of ylang-ylang, and 10 grams of extract of jasmine; stir well.

STARCH CREAMS

If starch is boiled in water it becomes almost soluble; by adding glycerine to the water, a glycerate of starch is obtained which forms an excellent cosmetic cream. The glycerates are used medicinally, are found in many pharmaceutical forms, and are used frequently in linaments and pomades.

The glycerate of starch of pharmacy is prepared thus :—

Starch	10 grams
Distilled water	10 "
Glycerine	130 "

Put the starch with the mixture of glycerine and water in a warm porcelain mortar, and heat, stirring continuously with a spatula until the contents jellify. Glycerated oxide of zinc is prepared by mixing 20 grams of glycerate of starch and 10 grams of oxide of zinc.

As can be seen, the preparation of glycerates alone is quite simple. Where complications arise is when it is a question of glycerate creams for cosmetics, and it becomes necessary to modify their natural consistency and to perfume them economically. Cerbelaud combines the two formulæ given in the following manner :—

Glycerine of Starch and Oxide of Zinc Cream.

A	Glycerate of starch	750 grams
	Oxide of zinc	50 "
	Tincture of ambergris, 1 per cent.	1 gram
	Extract of jasmine	5 grams
	" ylang-ylang.....	5 "
B	Synthetic glycine	2.50 "
	Gelose in shreds	2 "
	Rose-water	250 "

I Triturate the oxide of zinc with the perfumes; a perfect mixture is obtained in a few seconds.

II. Add the glycerate of starch which has already been prepared some days, warming 650 grams of glycerine with 50 grams of rose-water, adding a mixture of 50 grams of starch and 50 grams of rose-water first made into a paste.

III. Wash in plenty of water 2 grams of gelose, then boil in 250 grams of rose-water till dissolved. When solution is complete and the total weight reduced to 200 grams by heating, filter through paper or gauze. Stir with the glycerate, adding colouring matter: 1 cm. of a concentrated solution of eosin and 1 drop of tincture of saffron (1 in 10) for rose cream; 0.25 gram of burnt sienna and 1 gram of powdered orris for crème Rachel.

Another Formula

Ferville uses somewhat different means to obtain a sufficiently firm cream. He stirs together the following :—

A	Rice flour	20 grams
	Water	40 "
B	Oxide of zinc	8 "
	Glycerine	20 "

Dissolve at gentle heat the following :—

C	Gelatine	2 grams
	Rose-water	130 "

Warm at a gentle heat 130 grams of glycerine and 80 grams of water, add to the warm liquid (not boiling) product A, stirring till jellified. Pour the warm mixture into mixture B, beat and add C, then perfume with the following :—

Tincture of artificial musk	12 drops
" benzoin	40 "
" vanilla	20 "
" tonquin beans	40 "
Extract of ambergris	12 "
" patchouli	5 "
" violet	5 "
" heliotrope	5 "

Finally filter the mixture to remove gritty particles. The well-known product sold under the name of "Cream Simon" is matched by a mixture of glycerate of starch and oxide of zinc. According to Cerebalaud, a similar product can be obtained as follows :—

I.	Starch or arrow-root	10 grams
	Rose-water	70 "
II.	Glycerine, 30 per cent.	140 "
	Rose-water	10 "
III.	Powdered oxide of zinc	8 "
	Coumarin	0.3 gram
	Heliotrope	0.3 "
	Tincture of benzoin	3 grams
	" lignaloe wood	3 "
	" ambergris, 1 per cent.	1 gram
	" artificial musk, 6 per mille.	1 "

Warm II, then add I, stir well and constantly. Pour the glycerate obtained, after cooling, into mixture III, which has been brought to a uniform consistency. Stir and futer. Slight modifications of this method of working will produce analogous creams such as :—

Loris or Lily Cream.—Mix I and II and add 0.75 gram of gelatine dissolved in 4 grams of rose-water. Replace the different perfumes of III by 1 to 5 grams of heliotropin.

Bayard Cream.—After mixing I and IP in the ordinary way, stir well with 10 grams of finely powdered Marseilles soap. Leave for one or two days, then stir with 3.5 grams of extract of jasmine, 0.01 gram of artificial musk, and 0.02 gram of coumarin.

Hydrated Aromatic Glycerine.

Natural glycerine, perfectly neutral, possesses hygienic properties. Perfumery thus gives us an hydrated glycerine, slightly aromatic, which is accepted as one of the best preservatives against the action of too keen or too cold air, or for skins subject to roughness, chaps, and wrinkles. Prepare by taking:—

Pure glycerine, 30 per cent.	1 kilo.
Rose-water	600 grams

Rose-water can be replaced by any other aromatic water, also by pure distilled aromatic water. But, in the latter case, filter before bottling.

Toilet Milks

These products are named toilet milks because of their appearance. A certain difficulty exists, not in the preparation of a milky liquid itself, but in the methods employed to render the milky appearance permanent.

“Lait Virginal”—Simple

Rose-water	2 l. 200 c.c.
Tincture of benzoin	800 grams
Glycerine, 30 per cent.	300 „
Solution of borax, 2 per cent.	200 „

“Lait Virginal”—Compound

Alcohol, 95 per cent.	5 litres
Benzoin	300 grams
Storax	300 „
Cinnamon	60 „
Infusion of ambergris	30 „
„ musk	30 „

Infuse fifteen days, filter and add:—

First quality toilet soap	75 grams
Glycerine	1 litre
Orange-flower water	1 „
Salicylic acid	6 grams

Lilac Virginal Milk

Alcohol, 95 per cent.	1 litre
Lilac aromatic water	2 l. 250 c.c.
Glycerine	750 grams
Sweet almonds	500 „
Salicylic acid	6 „

Compound Milk of Orris (English)

Spermaceti	30 grams
White wax	30 "
Powdered soap	30 "

To this base add 560 grams of oil of sweet almonds. Also take :—

Infusion of orris	1 litre
Distilled water.....	1 "
Glycerine	1 "
Oil of orris	30 grams
Salicylic acid	6 "
Ionone	6 "

Add the above mixture in small quantities, stirring until the milk is perfect.

Milk of Roses (English)

Melt as above, spermaceti, white wax, and powdered soap in oil of sweet almonds, then pour into :—

Rose-water	1 l. 500 c.c.
Infusion of rose	1 litre
Glycerine	1 "
Oil of French geranium	30 grams
Salicylic acid	6 "
Phenyl ethyl alcohol	3 "

Milk of Almonds

First quality white powdered soap	30 grams
Spermaceti	30 "
White wax	30 "
Oil of almonds	560 "
Borax	30 "

Pour this base mixture into :—

Alcohol, 95 per cent.	1 litre
Distilled water.....	1 "
Glycerine	1 "
Essence of bitter almonds	12 grams

Product to remove Tattoo Marks

Glycerine	75 parts
Water.....	25 "
Papaïne	5 "
Dilute hydrochloric acid	1 part

Crush the papaïne and mix with the water and hydrochloric acid; leave for an hour, then add the glycerine; leave for three hours and filter.

Waters to Cure Freckles

This type of product is divided into two groups: those which act as decolorants and those which act as mordants on the

skin. In the first group the active element is chiefly peroxide of hydrogen. The following is a formula for this type :—

Rose-water	800 grams
Hydrogen peroxide, 30 vols.	100 „

Damp the red spots with a small sponge dipped in the solution. The hydrogen peroxide exercises a very swift decolouring action.

•
Cream to Remove Freckles

Lanoline	1500 grams
Rose-water	700 „
Oil of sweet almonds	500 „
Beeswax	100 „
Borax	150 „
Hydrogen peroxide	150 „
Oil of bergamot	60 „
„ orris	10 „
Ionone	5 „
Oil of violet leaves	4 „

Prepare exactly as with cold cream. Hydrogen peroxide may be replaced by peroxide of zinc, 50 to 60 per cent.

Another Formula

White vaseline.....	1 kilo, 800 c.c.
Pborate of soda	70 grams
Oil of bergamot.....	15 „
„ geranium	5 „

This product is also excellent for whitening the skin. The mordants are seldom used. The chief ingredient is salicylic acid dissolved in alcohol and slightly perfumed.

PRODUCTS FOR BEAUTIFYING THE NAILS

A necessary condition for attractive finger nails is a perfect shape. For this, the nails are washed in soap and warm water two or three times a day, using a brush which is not too hard. If the skin of the hands is very tender, add a little borax to the washing water. Then rub the skin of the fingers with a piece of fine pumice to prevent the formation of callosities, massage all wrinkles and creases, remove the “quicks” on the inner edge of the nail, using small, sharp scissors and uncover the “half-moons” by lightly rolling back the skin from the nail edge. After these preliminaries, dry the nails and shape elegantly, preferably rather short, as long nails are difficult to keep tidy and are easily broken, thus wasting the care bestowed on them.

If the nails become brittle, bathe in a solution of alum (1 in 10), after this, treat the nails with :—

Rose Nail Solution (C'erbelaud)

Rose-water	1000 grams
Borax	25 "
Glycerine	70 "

Another Formula

Rose-water	1000 grams
Eau de Cologne	100 "
Infusion of myrrh (1 in 50)	50 "
Tartaric acid	50 "

Then polish the nails with the aid of a small, soft hair-brush and polishing paste of the following formulæ :—

Enamel Nail Paste

White wax	400 grams
Spermaceti	400 "
Soft paraffin	5400 "
Eosin	15 "
Artificial ylang-ylang	10 "
Terpineol	2 "
Hawthorn	2 "

Dissolve the eosin in alcohol and add to the wax base.

Another Formula (Powder)

Oxide of tin	1000 grams
Very fine talc	400 "
Carmine	10 "
Artificial essence of rose	5 "
Essence of bergamot	3, "

Nail Polish Paste

Oxide of tin	500 grams
Powdered green tragacanth	2 "
Glycerine	5 "
Solution of carmine	40 "
Rose-water	200 "
Essence of jasmine	2 "

Another Formula

Soap cream	500 grams
Water	200 "
Solution of chloride of tin (10 per cent.)	500 "
Oxide of tin	75 "
Carmine	20 "
Terpineol	10 "
Geraniol	20 "

The brilliance of the polish may be enhanced by treating the nails with a special varnish prepared thus :—

Chloroform	150 grams
Paraffin wax	15 "

Perfume with a little essence of rose or geranium.

CHAPTER IX

FIXATIVE COSMETICS, OILS AND POMADES

GENERAL REMARKS

THE use of oils and pomades has decreased considerably of late. Men wear their hair very short and seem to have an instinctive dislike for grease and pomades; even ladies have shared the prejudices of the sterner sex, and the pomade pot is no longer usually found on their toilet table. Further, it is a fact that early baldness, which once was quite rare, is making marked progress, as much among women as among men, and though this phenomenon may be due to various causes, it is doubtless also due in a large degree to neglect in rubbing the hair with fatty matter. Be that as it may, the secrets of the old oils and pomades will be exposed hereafter in this volume.

Their preparation demands much attention and professional knowledge. The raw materials which the perfumer uses in making up these products are sufficiently numerous and important, but, in addition to understanding these, he must know how best to combine them and how to prevent them turning rancid.

The principal oils used (not drying oils) are those of olive, pea-nut, sweet almond, rape-seed (pressed when cold), liquid paraffin and debloomed vaseline oil. Oil of sesame, once much used, has been abandoned, since it has been stated that it resinifies very easily. For the preparation of a cheap article, excellent results are obtained by the use of a mixture of 1 part of olive oil and $1\frac{1}{2}$ parts of white petroleum oil. Oil of ben is the best of all, being very fluid, tasteless, odourless, and lasts well without turning rancid. Unfortunately, it is very scarce and very costly.

• The best means of preserving the oils and preventing them from becoming rancid is to treat them in the same manner as fatty matter destined for the extraction of perfume from flowers. Warm the oil in a water-bath and suspend in it a gauze bag in which are powdered benzoin (50 grams) and boric acid (100 grams) (each per kilo. of oil). Boric acid is used to prevent the benzoin

from solidifying. The oil dissolves a part of the resin; this latter imparts a light perfume and prevents the oil from turning rancid. Leave for half a day, then withdraw the gauze and allow the oil to cool and to stand. The required perfume may then be added.

INFUSIONS WITH OIL

Aromatic matters employed for perfuming the oils (infusions with oils) undergo the same preliminary operations as alcoholic infusions; powder the grains, resins, etc.; the vanilla, vanillon, and musk-pod are cut into very small pieces. Substances so prepared are placed in oil and the mixture stirred every day for a month. A special agitator, made by Savy, Jeanjean et Cie, does this automatically, and shortens the process considerably. If this is not available, leave as long as possible, so that the oil may absorb the perfume.

Infusion of Civet in Oil

Civet	120 grams
Olive oil	10 kilos.

Coumarin Infusion

Coumarin	100 grams
Olive oil	10 kilos.

Infusion of Orris (Concrete)

Concrete essence of orris	6 grams
Olive oil	10 kilos.

Infusion of Heliotropin

Heliotropin	100 grams
Olive oil	10 kilos.

Infusion of Musk

Musk	50 grams
Olive oil	8 kilos.

Infusion of Storax

Storax	21 kg. 500 c.c.
Olive oil	8 kilos.

Infusion of Vanillin

Vanillin	30 grams
Olive oil	10 kilos.

Infusion of Archil

Archil root	4 kilos.
Olive oil	16 "

It is the mixture of the infusion oils with the ordinary oils and certain essences (excluding alcoholic infusions) which constitutes the aromatised oil of perfumery, whatever be the name given to them. Below are a few formulæ for this type of product:—

OLD-ESTABLISHED FORMULÆ

Fine Rose Oil

Olive oil	2 kilos.
Rose oil, No. 6	2 "
Jasmine oil, No. 6	2 "
Oil of geranium	60 grams
" cloves	6 "
" bergamot	16 "
Infusion of musk-pod in olive oil	10 "

Fine Violet Oil

Olive oil	2 kilos.
Cassie oil, No. 6	1 kg. 500 c.c.
Orange oil, No. 6	100 grams
Jasmine oil, No. 6	100 "
Rose oil, No. 6	100 "
Infusion of orris oil	1 kg. 500 c.c.
Essence of bergamot	15 grams
" santal	4 "
" geranium	1 gram
Infusion of musk pod in oil	8 grams

Superfine Violet Oil

Jasmine oil, No. 6	1 kg. 200 c.c.
Rose oil, No. 6	800 grams
Jasmine oil, No. 24	600 "
Rose oil, No. 12	400 "
Orange oil, No. 6	400 "
Cassie oil, No. 24	1 kg. 200 c.c.

Fine Jockey Club Oil

Olive oil	3 kg. 400 c.c.
Orange oil, No. 6	400 grams
Cassie oil, No. 6	400 "
Rose oil, No. 6	400 "
Tuberose oil, No. 6	200 "
Jorqui oil, No. 6	200 "
Oil of cloves	6 "
" lemon	40 "
" bergamot	15 "
Infusion of musk-pod in oil	8 "

Fine Orange Oil

Olive oil	2 kilos.
Orange oil, No. 6	1 kg. 800 c.c.
Oil of neroli	5 grams
" sweet orange	50 "
" bergamot	100 "

Fine Vanilla Oil

Olive oil	3 kilos.
Infusion of coumarin in oil	500 grams
Orange oil, No. 6	400 "
Rose oil, No. 6	300 "
Oil of geranium	2 "
" bergamot	5 "
" bitter almonds	2 "
Infusion of civet in oil	5 "
" musk-pod in oil	3 "
" vanillin in oil	400 "

Superfine Vanillin Oil

Vanilla oil	3 kilos.
Rose oil, No. 24	1 kilo.
„ „ No. 6	500 grams
Cassia oil	500 „
Jasmine oil	500 „
Tuberose oil	300 „
Balsam of Peru oil	100 „
Infusion of musk in oil	50 „
Otto of rose	2 „

Mignonette Oil

White oil	1 kg. 500 c.c.
Jasmine oil	500 grams
Orange-flower oil	400 „
Cassia oil	400 „
Infusion of ambergris in oil	10 „
Oil of bergamot	6 „
„ cloves	5 „
„ geranium	4 „

Heliotrope Oil

White oil	1 kg. 500 c.c.
Vanilla oil	500 grams
Jasmine oil	250 „
Cassia oil	250 „
Rose oil	250 „
Orange-flower oil	250 „
Balsam of Peru	25 „
Oil of bergamot	10 „
„ bitter almonds	10 „

Bouquet Oil

White oil	1 kg. 500 c.c.
Jasmine oil	500 grams
Rose oil	500 „
Orange-flower oil	500 „
Cassia oil	250 „
Oil of bergamot	30 „
„ cloves	20 „
„ thyme	2 „
„ cinnamon	2 „

Fine Sweet Orange Oil

Olive oil	7 kilos.
Orange oil, No. 6	1 kilo.
Oil of sweet orange	200 grams

Fine Jasmine Oil

Olive oil	3 kilos.
Jasmine oil, No. 6	2 „
Oil of geranium	20 grams
„ bergamot	15 „
„ wintergreen	5 „

Fine Musk Oil

Olive oil	3 kilos.
Rose oil, No. 6	500 grams
Infusion of orris oil	500 „
„ musk-pod in oil	500 „

FIXATIVE COSMETICS, OILS AND POMADES 269

Fine Patchouli Oil

Olive oil	750 grams
Rose oil, No. 6	250 "
Infusion of vanillin in oil	100 "
Oil of patchouli	20 "

Fine Macassar Oil

Olive oil	5 kilos.
Orange oil, No. 6	2 "
Cassia oil, No. 6	500 grams
Rose oil, No. 6	500 "
Oil of cloves	15 "
" cinnamon	4 "
" bergamot	40 "
" geranium	12 "
Infusion of musk-pod in oil	5 "
" civet in oil	5 "
" turmeric in oil	ad lib.

Macassar oil

Infusion of benzoin in oil	5 kilos.
" cananga in oil	10 grams
Orange oil, No. 6	1 gram
Rose oil, No. 6	5 grams
Infusion of turmeric in oil	100 "

Quinine Oil

Olive oil	5 kg. 500 c.c.
Rose oil, No. 6	250 grams
Jasmine oil, No. 6	250 "
Orange oil	250 "
Cassia oil, No. 6	200 "
Quinine in oil	200 "
Oil of petitgrain	12 "
" cloves	30 "
" geranium	8 "
" bergamot	60 "
" cinnamon	3 "
Archil in oil	60 "
Annato in oil	50 "

Skin Massage Oil (Monin)

Oil of sweet almonds	100 grams
" bitter almonds	10 "
Balsam of Tolu	2 "
Benzoin	2 "
Oil of lemon	5 drops
" cajuput	2 "

OILS FOR EXPORT

Lily of the Valley Flower Oil

Oil of jasmine, No. 6	2 kilos.
" rose, No. 6	2 "
Olive oil	2 "
Muguet	15 grams
Linalol	5 "
Coumarin oil	50 "
Orgeol or Citronellol	5 "

A Similar Oil

Muguet, 100 per cent.	10 grams
Vanillin	2 "
French otto of rose	2 "

Rose-Flower Oil

Oil of rose, No. 6	5 kilos.
Olive oil or paraffin oil	5 "
Artificial rose	40 grams
Bourbon geranium	10 "

Lilac Oil

Oil of jasmine, No. 6	2 kilos.
" rose, No. 6	2 "
Olive oil	3 "
Terpineol	100 grams
Muguet	10 "
Hyacinth flowers (100 per cent. Harlen)	3 "

Orange-flower Oil

Orange-flower oil, No. 6	5 kilos.
Rose oil, No. 6	1 kilo.
Olive oil	4 kilos.
Artificial neroli oil	10 grams

Oil of Quinine

Olive oil or vaseline	3 kilos.
Cinchona bark oil	2 "
Oil of cassia, No. 6	1 kilo.
" rose, No. 6	1 "
" bergamot	100 grams
" sweet orange	40 "
" citronella	20 "
" artificial rose	50 "
isoEugenol	10 "
Red oil	100 "

Obtain the red colour with aniline dissolved in mineral oil. Archil root may equally well be used, and it gives a beautiful red effect. The preparation of this is very simple, for it is sufficient to scrape the warm root into a vegetable oil. For example, take 200 grams of chopped archil roots, add 1 kilo. of olive oil, and warm for a day at 60°; then decant and add another 1 kilo. of oil. Renew the oil as often as necessary to remove the colouring matter. Prepare the quinquina bark oil in the same way.

Queen's Oil

A red oil similar to quinine oil:

Petroleum oil	10 kilos.
Red oil	500 grams
Oil of rosemary	200 "
" cloves	100 "

Red Macassar Oil

This oil, which has been one of the chief specialities of the perfumery trade and has enjoyed a large vogue during the last century, is still an excellent article for export :—

Olive oil	1 kilo.
Artificial neroli	0.5 gram
" rose	1 "
Terpenless oil of rosemary	5 grams
Origanum oil	10 "
Eugenol	1 gram
Red colouring matter	9 grams

Macassar Oil (Another Formula)

Oil of sweet almonds	2 kg. 500 c.c.
Olive oil	2 kg. 500 c.c.
Oil of cananga	10 grams
" bitter orange	10 "
Geraniol	40 "
Bergamot oil	10 "

Macassar Oil (Another Formula)

Coloured paraffin oil	3 kg. 500 c.c.
*Liquid paraffin	1 kg. 500 c.c.
Bergamot oil	50 grams
Citronella oil	35 "
Geraniol	15 "

Perfume for Cheap Oils

Essence of bergamot	1 kilo.
Eugenol	250 grams
isoSafrole	25 "
Oil of cassia	500 "
" geranium	500 "
" sweet orange	250 "
Terpineol	500 "

This can be employed to perfume various cheap oils; the amount used is governed by the price of sale; *e. g.* :—

I. { Olive oil	5 kilos.
{ Arachis oil	15 "
{ Above perfume	350 grams
II. { Earthnut oil	20 kilos.
{ Yellow liquid paraffin	5 "
{ Above perfume	425 grams
III. { Earthnut oil	5 kilos.
{ Yellow liquid paraffin	20 "
{ Above perfume	325 grams

AROMATISED MINERAL OIL

For some years certain petroleum oils, bleached and made odourless, have been used in the manufacture of liquid cosmetics for the same purpose as petroleum jelly in pomades. These

* "Liquid Paraffin" is a highly refined and an odourless distillate of petroleum.

hydrocarbon oils, colourless and odourless, present the advantage of not turning rancid or matting the beard and hair.

The methods of aromatising the purified mineral oils are the same as for vegetable oils. It is enough therefore to mention that the coloration of this type of oil is very easy, as certain artificial colours are soluble in hydrocarbon oils and these bodies do not exercise the same action as neutral fatty bodies on this kind of pigment.

We give below the formula for the preparation and use of an oil to prevent loss of hair, and which is said to possess the more remarkable property of causing it to grow; we give it for what it is worth.

<i>Hair Restorer</i>		
Oil of birch	200	grams
Petroleum jelly	600	"
Lanoline	600	"
Oil of quinine	100	"

Mix in a water-bath with enough paraffin to give it a pasty consistency; perfume with infusion of heliotropin in oil. Every evening for six consecutive weeks rub the hair with a piece of the unguent the size of a nut and then cover the head with flannel. Take off the flannel every morning and dry the head with a cotton towel.

Every week give a friction shampoo, No. 1. After six weeks of this treatment cease the treatment for a fortnight and then recommence as above, and continue till a satisfactory result is attained.

POMADES

To make pomades, use hard, fatty bodies, soft fatty bodies, and oils. The proportion of hard fatty bodies used, such as tallow, wax, kerosine, spermaceti, and lanoline vary in season and temperature; less is used in winter than in summer, for pomade should possess a definite consistency.

Perfumers also use exhausted flower pomades as the basis of pomade No. 4. Whatever be the extent of the exhaustion, a certain quantity of perfume of great delicacy is retained. Proceed as follows to prepare the body of a good quality pomade. In a tinned copper cauldron warm 50 kilos. of best quality lard with 15 litres of water in which 2 kilos. of kitchen salt have been dissolved and 1 kilo. of alum, boil for two hours, then leave, and decant the pure fat, separating the water which contains the fibre and other impurities of the fat, and dry by heat. Return

the fat to the cleaned vessel, and melt again. When clarified, which happens when the last traces of water are evaporated, suspend a bag in the fat containing 2 kilos. of benzoin in powder and 1 kilo. of boric acid, and leave for twenty-four hours: then remove the bag and add to the 50 kilos. of lard 1 kilo. of pale ceresine. Pour all into a receptacle in which the pomade is to be kept, add, stirring continuously, 20 kilos. of white vaseline, stir again until solid, which takes about half an hour. Keep the pomade in a dark, airy, fresh place. Pomades prepared with these bases keep without deterioration. As the fatty bodies which enter into the composition of the base of the pomade have not the same melting point and point of solidification, they have a tendency to separate. It is thus necessary to stir the mixture continuously until sufficiently homogeneous. This work is troublesome, especially when the operation is nearing the end. Struck by this inconvenience, Beyer Brothers have designed an apparatus which enables this result to be arrived at mechanically; it is the "pomade mixer." The machine is made of several vats of stamped steel or copper, in which the matter to be treated is well beaten by helicoid plates on a vertical axis which are revolved by a series of wheels and cogs.

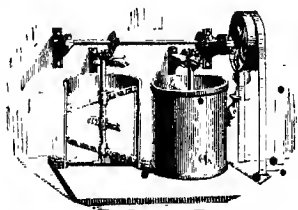


FIG. 13.—POMADE MIXER

A special disposition of the upper guide allows of rapid taking to pieces of the vertical arm for cleaning both it and the copper pans; the latter are drained by a tap placed at the bottom of the vessel.

Whilst the pomade is cooling, the colouring matter which has previously been dissolved in part of the fat is added. The following colouring matters are used:—

- Yellow* : alcoholic tincture of turmeric.
- „ : alcoholic tincture of saffron.
- „ : ethereal tincture of annato.
- Red* : alcoholic tincture of archil.
- Green* : alcoholic tincture of chlorophyll.
- Brown* : mixed tinctures of archil and chlorophyll.

Palm oil is also a good colouring material. Below are some formulæ for pomade bases.

<i>Super Quality Base Pomade</i>		
Cocoa butter	20	kilos.
Oil of sweet almonds	8	„
18		

The Same (Slightly more Solid)

Cocoa butter	20 kilos.
Oil of sweet almonds	8 "
Ceresine or beeswax	2 "

1st Quality Base

Beef suet (fat)	20 kilos.
Lard	40 "

1st Extra Quality

Beef suet (fat)	20 kilos.
Hog's lard	20 "
Exhausted flower pomade	20 "

It is to be understood that materials which enter into the composition of the pomade must all be purified before use and prepared according to the above described methods.

Petroleum Jelly Base for Pomade

Petroleum jelly is much used in pomade manufacture. In fact, petroleum jelly, like all hydrocarbons of like nature, does not turn rancid, and only requires a relatively small amount of aromatic material in order to acquire a very pleasant perfume, and, if a little soft, can easily be hardened by a slight addition of beeswax, or, better still, of ceresine, without modifying the basic products. Further, petroleum jelly is an efficient lubricant and does not mat the hair to the same extent as oxidisable fatty oils; thus its rôle is clearly defined in this part of the manufacture, and if we do not advise its exclusive use, it is because its action on the hair is not quite the same as that of natural fats. Petroleum jelly will often appear in these formulæ, concurrently with pomade bases, and for certain purposes we shall point out some instances where petroleum jelly is the only vehicle employed.

Petroleum jelly	1 kilo.
Ceresine	1 "

Another Base with Petroleum Jelly

Petroleum jelly	2 kg. 500 c.c.
Beeswax	1 kg. 500 c.c.

Base with Lanoline

Lanoline can equally be used in the preparation of non-oxidising pomades: it is rapidly absorbed by the hair and strengthens its roots:—

Lanoline	3 kg. 500 c.c.
Cocoa butter	500 c.c.

FIXATIVE COSMETICS, OILS AND POMADES 275

Alternative Formula

Lanoline	2 kilos.
Petroleum jelly	2 „

Perfumers also manufacture certain transparent pomades of a more crystalline texture, called crystalline pomades. Spermaceti mixed with vegetable oils forms in these the base of the pomade.

Base of Crystalline Pomade

Olive oil	2 kg. 500 c.c.
Spermaceti	500 grams

Besides the various pomade bases which we have just discussed, the manufacture of soft cosmetics (pomades) requires the use of flower pomades less concentrated than those known as flower pomades, No. 36. Few perfumers prepare them themselves; they buy them direct from the factories in the south of France.

SIMPLE FAT INFUSIONS

The name of simple fat infusions is usually given to other preparations made by the digestion of a solid fat melted with aromatic substances other than flowers, which are made directly by the perfumer. Beef suet is melted on a water-bath. The seeds, resins, etc., are crushed to a powder and added in small quantities while the mixture is stirred until it is completely cold. It is then left to infuse for a month.

Vanilla, vanillon, and musk-pods must be cut up as small as possible and added to the fat in the same way. As the substances do not yield all their perfume to the fat with which they are mixed, they are withdrawn after a month by melting the fat on a water-bath and passing it through a strainer, which retains the impurities. They are then pulverised and added again to fresh fat, giving a second infusion.

Gum Benzoïn Infusion

Beef suet or fat	25 kilos.
Gum benzoïn	5 „

Castoreum Infusion

Castoreum	365 grams
Fat	10 kilos.

Treat as above described.

Civet Infusion

Civet	120 grams
Fat	10 kilos.

Heliotropin Infusion

Heliotropin	400 grams
Fat	15 kilos.

Concrete Orris Infusion

Concrete oil of orris	10 grams
Fat	10 kilos.

Musk Infusion

Musk	48 grams
Fat	10 kilos.

Storax Infusion

Storax	7 kilos.
Fat	10 "

Tonquin Infusion

Tonquin beans	2 kg. 500 c.c.
Fat	12 kilos.

Vanilla Infusions

Vanilla	1 kilo.
Fat	10 kilos.

Vanillon Infusion

Vanillon	1 kilo.
Fat	10 kilos.

We can now pass to various formulæ for pomades, beginning with those of a cheaper kind and going on to those of a finer quality.

ORDINARY POMADES

Rose Pomade (Nos. 1 and 2)

White petroleum jelly	12 kilos.
Beef suet	20 "
American lard	32 "
Palmarosa oil	60 grams
Oil of cloves	80 "

Colour pale yellow.

Jasmine Pomade (Nos. 1 and 2)

White petroleum jelly	12 kilos.
Beef suet	20 "
American lard	32 "
Colourless oil of mirbane	120 grams
Niobe oil	162 "
Citronella oil	80 "

Treat as above described.

Citron Pomade

White petroleum jelly	12 kilos.
Beef suet	20 "
American lard	32 "
Oil of sweet orange	480 grams
Citronella oil	160 "

FIXATIVE COSMETICS, OILS AND POMADES 277

Violet Pomade

White petroleum jelly	12 kilos.
Beef suet	20 "
American lard	32 "
Oil of lemon	225 grams
Bergamot oil	30 "
Citronella oil	25 "
Oil of cloves	26 "

NO. 2 POMADES (KNOWN IN FRANCE AS "4 FINES")

Rose Pomade

Lard	15 kilos.
Beef suet	7 "
Petroleum jelly	3 "
Geranium oil	123 grams
Oil of cloves	20 "
Bergamot oil	10 "
Chinese cassia oil	5 "
Infusion of musk-pod in oil	3 "
" benzoin in oil	10 "

Orange Pomade (Nos. 3 and 4)

Lard	17 kilos.
Beef suet	2 "
Petroleum jelly	2 "
Oil of sweet orange	50 grams
Bergamot oil	100 "

Treat as above.

Yellow Rose Pomade (Nos. 3 and 4)

Lard	17 kilos.
Beef suet	2 "
Petroleum jelly	1 kilo.
Rose pomade, No. 6	2 kilos.
Geranium oil	122 "
Oil of cloves	20 "
Bergamot oil	10 "
Chinese cassia oil	5 "

Patchouli Pomade

Lard	2 kg. 500 c.c.
Beef suet	300 grams
Petroleum jelly	150 "
Patchouli oil	30 "

NO. 3 POMADES (KNOWN IN FRANCE AS "FINES")

Bouquet Pomade (No. 6)

Lard	22 kg. 700 c.c.
Beef suet	4 kilos.
Petroleum jelly	2 "
Orange pomade, No. 6	11 kg. 300 c.c.
Bergamot oil	110 grams
Oil of cloves	40 "
" lemon	8 "
First infusion of musk-pods	20 "
Geranium oil	25 "

Magnolia Pomade (No. 6).

Lard	8 kg. 200 c.c.
First infusion of benzoin	400 grams
Orange pomade, No. 6	500 "
Rose pomade, No. 6	900 "
Bergamot oil	20 "
Oil of lemon	20 "
" bitter almonds	5 "
First infusion of musk	6 "

Heliotrope Pomade, No. 6

Lard	24 kg. 625 c.c.
Beef suet	4 kg. 500 gr.
Petroleum jelly	2 kg. 500 c.c.
First vanillon infusion	500 grams
Second vanillon infusion	800 "
Cassia pomade, No. 6	2 kg. 600 c.c.
Rose pomade, No. 6	2 kg. 800 c.c.
Orange pomade, No. 6	2 kg. 600 c.c.
Infusion of balm of Peru	100 grams
Oil of bitter almonds	15 "
" wintergreen	20 "

Jasmine Pomade, No. 6

Lard	22 kg. 200 c.c.
Jasmine pomade, No. 6	15 kilos.
First infusion of tonquin	1 kilo.
Second infusion of tonquin	1 "
Infusion of civet	200 grams
" storax	200 "
Oil of petitgrain	8 "
" wintergreen	4 "
Bergamot oil	80 "
Geranium oil	40 "

Vanilla Pomade, No. 6

Lard	5 kg. 500 c.c.
Rose pomade, No. 6	300 grams
First infusion of vanilla	800 "
" tonquin	230 "
" benzoin	2 kg. 500 c.c.
Balm of Peru	50 grams
Oil of bitter almonds	5 "
Geranium oil	10 "

Violet Pomade, No. 6

Lard	8 kg. 500 c.c.
First infusion of orris	1 kilo.
Cassia pomade, No. 6	600 grams
Rose pomade, No. 6	200 "
Orange pomade, No. 6	100 "
Jasmine pomade, No. 6	100 "
Bergamot oil	50 "
Oil of cedrat	20 "
First infusion of musk	6 "

FIXATIVE COSMETICS, OILS AND POMADES 279

Carnation Pomade, No. 6

Lard	8 kilos.
Orange pomade, No. 6	200 grams
Rose pomade, No. 6	1 kilo.
First infusion of benzoin	800 grams
Oil of cloves	75 "
Cinnamon oil	15 "
Geranium oil	20 "

Lily of the Valley Pomade, No. 6

Lard	8 kg. 200 c.c.
Jasmine pomade, No. 6	900 grams
Orange pomade, No. 6	900 "
Neroli oil	6 "
Oil of bitter almonds	2 "
Bergamot oil	20 "

Cassie Pomade

Fat	8 kilos.
Jasmine pomade	1 kilo.
Storax	125 grams
Neroli oil	5 "
Terra Merita	6 "
Orange pomade	3 kilos.
Tuberose oil	30 grams
Tonquin bean pomade	180 "
Oil of bitter almonds	5 "

A Useful Bergamot Pomade

Fat	3 kilos.
Rose pomade	4 "
Beef suet	1 kilo.
White oil	1 "
Liquid rose pomade	1 "
Oil of cloves	35 grams
Bergamot oil	125 "
Cinnamon oil	4 "

Hawthorn Pomade

Tonquin infusion	500 grams
Vanilla infusion	500 "
Jasmine pomade	100 "
Gum benzoin infusion	6 "
Olive oil or white oil :	700 "
Bergamot oil	5 "

Lemon Pomade

Fat	3 kilos.
Beef suet	1 kilo.
Orange-flower pomade	500 grams
Oil of lemon	150 "

Rose Pomade

Fat	4 kilos.
Beef suet	1 kilo.
Oil of roses	5 grams
Geranium oil	7 "
Bergamot oil	10 "
Musk infusion	5 "
Vegetable red	65 "

Sweet Orange Pomade

Fat	3 kilos.
Beef suet	1 kilo.
Orange pomade (bouquet)	500 grams
Oil of sweet orange	150 "
Bergamot oil	25 "

Jasmine Pomade

Fat	3 kilos.
Jasmine pomade	2 "
Storax	10 grams
Oil of rosemary	3 "

Orange Pomade

Fat	2 kilos.
Orange pomade	500 grams
Jasmine pomade	50 "
Oil	700 "
Oil of sweet orange	30 "

Violet Pomade

Fat	1 kg. 500 c.c.
Cassie pomade	1 kg. 500 c.c.
Jasmine pomade	100 grams
Oil	1 kg. 130 c.c.
Bergamot oil	30 grams
Oil of orris	3 "

No. 4 FINE POMADES (KNOWN IN FRANCE AS NO. 12).

Rose Pomade

Fat	2 kilos.
Rose pomade, No. 6	8 "
Oil of roses	20 grams
Geranium oil	100 "

Orange Pomade

Fat	2 kilos.
Orange pomade, No. 6	8 "
Neroli oil	30 grams
Oil of sweet orange	50 "

Jasmine Pomade

Fat	2 kilos.
Jasmine pomade, No. 6	8 "
Oil of roses	10 grams
Bergamot oil	30 "
Oil of wintergreen	20 "

Heliotrope Pomade

Fat	600 grams
First vanilla pomade	640 "
Jasmine pomade, No. 6	80 "
Tuberose pomade, No. 6	80 "
Cassie pomade, No. 6	120 "
Orange pomade, No. 6	40 "
First tonquin infusion	100 "
First vanilla infusion	200 "
Balm of Peru	20 "
Oil of bitter almonds	2 "

FIXATIVE COSMETICS, OILS AND POMADES 281

Lily of the Valley Pomade

Fat	500 grams
Cassie pomade, No. 6	350 „
Orange pomade, No. 6	90 „
Rose pomade, No. 6	90 „
Jasmine pomade, No. 6	270 „
Tuberose pomade, No. 6	150 „
First musk infusion	50 „
First tonquin bean infusion	50 „
Oil of petitgrain	3 „
Neroli oil	2 „

Special Patchouli Pomade

Vanilla pomade, No. 6	5 kilos.
Patchouli oil	75 grams

Special Bouquet Pomade

Fat	425 grams
Tuberose pomade, No. 6	150 „
Rose pomade, No. 6	225 „
Jasmine pomade, No. 6	225 „
Orange pomade, No. 6	75 „
Jonquil pomade, No. 6	300 „
First civet infusion	25 „
First musk infusion	25 „
Oil of balsam of Peru	10 „
Geranium oil	7 „
Bergamot oil	5 „

Special New-mown Hay Pomade

Fat	500 grams
Jasmine pomade, No. 6	280 „
Tuberose pomade, No. 6	200 „
Orange pomade, No. 6	370 „
Cassie pomade, No. 6	50 „
First civet infusion	10 „
First tonquin infusion	10 „
Oil of petitgrain	5 „
Verbena oil	2 „
Oil of bitter almonds	1 gram
„ lavender	4 grams

Petroleum jelly pomades made with the base noted above are perfumed in the following manner :—

Petroleum Jelly Pomade, Rose Bouquet

Base	10 kilos.
French geranium oil	120 grams
Neroli oil	20 „

Petroleum Jelly Pomade, Mignonette

Base	10 kilos.
Bergamot oil	60 grams
Neroli oil	60 „
Oil of bitter almonds	20 „

Petroleum Jelly Pomade, Lily of the Valley

Base	10 kilos.
Bergamot oil	60 grams
Linaloe oil	4 ..
Neroli oil	40 ..

Petroleum Jelly Pomade, Orange-flower Bouquet

Base	10 kilos.
Oil of lemon	100 grams
Neroli oil	20 ..
Bergamot oil	20 ..

Petroleum Jelly Pomade, Vanilla Bouquet

Base	10 kilos.
Balm of Peru	100 grams
Cinnamon oil	30 ..
Artificial oil of bitter almonds	20 ..

Petroleum Jelly Pomade, Heliotrope Bouquet

Base	10 kilos.
Balm of Peru	100 grams
Cassia oil	20 ..
Heliotropin	2 ..

Petroleum Jelly Pomade, Sweet Orange Bouquet

Base	1 kilo.
Oil of sweet orange	50 grams
Bergamot oil	20 ..

As substitutes for pomades, there has been used for some time an English preparation, an emulsion product of wax, oil, and glycerine, perfumed and known as :—

Lime Juice and Glycerine

White wax	500 grams
Oil of sweet almonds	2 kilos. 500 c.c.

are melted together in a water-bath and added to :—

Glycerine	300 grams
Citric acid	30 ..

dissolved in a litre of rose-water. Finally there are added with stirring in an automatic mixer :—

Alcohol, 95 per cent.	150 grams
Oil of lemon	75 ..
„ bitter almonds	10 ..

Brilliantine

Brilliantines and lustralines are also connected with pomades. Liquid brilliantines are simply mixtures of equal parts of olive oil or castor oil and a double or triple extract according to the desired cost. The bottles are half filled with oil, and the extract

FIXATIVE COSMETICS, OILS AND POMADES 283

is added. Extracts used for this purpose must not contain water, or the mixing of the oil and the extract will be prevented. The oil and the extract separate into two layers in the bottles; the bottle is shaken before use and a milky emulsion is formed which disappears when the brilliantine is left undisturbed again.

Instead of oil chemically pure, glycerine may be used, but oil is to be preferred because glycerine dries up the hair.

Liquid Lily of the Valley Brilliantine

First quality castor oil	1 kilo.
Alcohol, 90 per cent.	1 litre
Ylang-ylang oil	5 grams
Linalol	10 "
Terpineol	5 "
Gum benzoin infusion	35 "

Rose Brilliantine

First quality castor oil	1 kilo.
Alcohol, 90 per cent.	1 litre
Artificial oil of roses	2 grams
Geranium oil	5 "
Geraniol	5 "

Heliotrope Brilliantine

Liquid paraffin	600 grams
Alcohol, 90 per cent.	400 "
Extract of heliotrope	50 "
Amorphous heliotropin	1 gram
Crystalline vanillin	1 "

Violet Brilliantine

First quality castor oil	1 kilo.
Alcohol, 90 per cent.	1 litre
Solution of orris oil (1 : 6)	10 grams
Ionone	1 gram
Bergamot oil	3 grams
First musk infusion	3 "

San Remo Violet

Castor oil	1 kilo.
Second violet infusion	2 kilos.
Second jasmine infusion	150 grams

Orange-flower Brilliantine

Alcohol, 90 per cent.	1 litre
Castor oil	1 kilo.
Neroli infusion (in oil)	20 grams
Geranium infusion (in oil)	5 "
Verbena infusion (in oil)	5 "

Solid Brilliantine

The following are melted in a water-bath :—

Base of ordinary pomade	2 kilos.
Wax	1 kilo.
Rose-water	1 litre

The following, well emulsified in a mixer, are added :—

Castor oil	500 grams
Gum tragacanth	500 „
French geranium oil	10 „

Sulphuricinate Brilliantine (Gattefossé)

Sulphuricinate	200-400 grams
100 per cent. artificial perfume (very soluble)	2-10 „
Water to make 1 litre	

Brilliantines of this type are as greasy as those made with liquid paraffin;¹ they have the advantage of being able to be diluted with water, which allows of the price being reduced. Besides, they do not contain alcohol.

In conclusion, it is necessary to mention crystallised brilliantines, which do not seem to be very useful preparations, for they are made by a somewhat complicated process, and all complications in manufacture retard progress. Crystallised brilliantines are mixtures of greasy substances, either saponified or not, which are prepared under certain conditions and submitted, after pouring into their containers, to a very long cooling. In this way a kind of crystallisation is produced which gives the mass a pleasing appearance. But great care is necessary to obtain successful results.

The process is as follows.² Melt over a slow fire

Cocoa butter	100 grams
Lanoline	50 „
White liquid paraffin	350 „

Mix in a mortar 15 grams of finely pulverised caustic potash with 100 grams of liquid paraffin and slowly add to the preceding mixture of fat while melted, stirring it all the time. When the product begins to form a jelly, stop the addition of alkali; after cooling, the brilliantine forms a solid, transparent jelly. Saponification must not be complete, or the product will be too hard, and almost unmeltable, but the addition of a small amount of fatty acids will suffice to modify its consistency.

An equally fine product is obtained in a more simple manner by the use of the following formula :—

White ceresine	1 kilo.
White liquid paraffin	3 kilo. 500 c.c.
Artificial rose oil	25 grams
Geranium oil	15 „
Liquid hawthorn	5 „
Vanillin	5 „

¹ "Liquid paraffin" is a highly refined and an odourless distillate of petroleum.

² Cf. *Rev. générale de chimie pure et appliquée*, t. xvi. p. 253.

FIXATIVE COSMETICS, OILS AND POMADES 285

The ceresine is melted in a water-bath and heated to about 70°, the water-bath is then withdrawn, and the liquid paraffin added in a fine spray. The mixture is well mixed and the perfumes are added. The mass is then run into tubes and left to cool. Then the tubes are sealed mechanically.

A formula for a base for solid brilliantines:—

Lanoline	1 kilo.
White liquid paraffin	3 kilos.
White ceresine	500 grams

To perfume this, use: rose, ylang-ylang, lily of the valley, nignonette, violet, heliotrope, ess-bouquet; 40 grams or 20 grams per kilo. of the base should be used, according to the intensity of the perfume.

Some formulæ for these perfumes:—

Rose.—Geranium oil 100 grams, artificial rose oil 40 grams, vanillin 3 grams.

Ylang-ylang.—Bergamot oil 100 grams, oil of cananga 60 grams, ylang-ylang oil 40 grams, artificial rose oil 5 grams, linaloe oil 10 grams.

Lily of the Valley.—Linalol 100 grams, lily of the valley 60 grams, bergamot oil 20 grams, artificial rose oil 15 grams, vanillin 15 grams.

Mignonette.—Bergamot oil 100 grams, mignonette oil 15 grams, sandalwood oil 10 grams, isœugenol 5 grams.

Violet.—Bergamot oil 100 grams, 20 per cent. ionone 60 grams, liquid orris oil 15 grams, artificial ylang-ylang oil 5 grams, vanillin 5 grams.

Ess-bouquet.—Bergamot oil 150 grams, benzyl acetate 20 grams, terpineol 25 grams, artificial neroli oil 15 grams, geraniol 10 grams, linalol 10 grams, artificial rose oil 5 grams.

Heliotrope.—Bergamot oil 100 grams, heliotropin 100 grams, vanillin 10 grams, artificial rose oil 5 grams, artificial ylang-ylang oil 5 grams.

FIXATIVE COSMETICS, PROPERLY SO-CALLED

•• Fixative cosmetics, properly so-called, only differ from ordinary pomades by the more or less considerable degree of consistency which these preparations have, and which is obtained by the addition of 40 to 60 per cent. of wax or of ceresine, according to whether pomades called Hungarian or fixative cosmetics proper are in question.

Hungarian pomade is made by incorporating with an ordinary pomade 40 per cent. of white or yellow wax or of ceresine that has been previously melted. The consistency is thus increased without, however, necessitating the use of any pressure in applying it to the beard or moustache, to which it is applied as a fixative to give gloss and at the same time a certain stiffness sought by some amateurs.

True fixative cosmetics are sensibly harder, wax or ceresine is used in greater proportions in the mixture, and the product must naturally be able to keep its solid form after complete cooling.

The fatty base for fixatives is prepared in the same manner as the fatty base for pomades. For fixative cosmetics, however, only lard, finest bees' wax, and pure and clearest resin are used. The smell of the wax contributes to the perfume of the base.

As the cosmetics containing resin and wax are used chiefly as fixatives for the hair, it is preferable to add sesamie oil which, in conjunction with wax and resin, is an excellent fixative.

The melted mass, coloured as necessary, perfumed and made perfectly homogeneous in the mixer, is run, after previous slight cooling, into spacious white metal moulds, round or oval in shape, but bottomless, resting on a movable tray of the same metal with edges turned-up and higher than the moulds. Before running the cosmetic into the moulds, a certain quantity of it is poured on the tray and allowed to cool sufficiently for the grease to form a layer of cement between the walls of the moulds and the ground of the tray, and the moulding is not continued until some minutes after. The cosmetic being well cooled, the tray is detached and withdrawn sufficiently for the sticks to be detached from the metal easily and without spoiling their shape.

Hungarian pomades are treated like fixative cosmetics both for coloration and for perfuming. Black is obtained by the addition of peach or vine charcoal previously diluted with a little oil and triturated in a mortar; flaxen, auburn, and brown are made by the addition of a greater or less quantity of yellow ochre or red.

Hungarian Pomade

Gum arabic	1 kilo.
White wax	1 ..
	2 kilos.
Geranium oil	3 grams
Oil of sweet orange	3 ..
Bergamot oil	3 ..

FIXATIVE COSMETICS, OILS AND POMADES 287

FINE COSMETICS

Vanilla Cosmetics

Beef suet	5 kilos, 500 c.c.
Suet infusion of gum benzoin	3 „ 400 c.c.
White wax	3 „
Rose pomade base (hard), No. 6	600 grams
Jasmine pomade base (hard), No. 6	500 „
1st beef suet infusion of tonquin	500 „
„ „ „ vanillon	1 kilo, 360 c.c.
Cocoa butter	500 grams
Balsam of Peru	4 „
Oil of bitter almonds	16 „
Bergamot oil	16 „
1st oil infusion of vanillon	54 „

Alternative Formula

White wax	270 grams
Beef fat	500 „
Vanilla pomade base	500 „
Cocoa butter	125 „
Essence of vanilla	15 „
Rose pomade base	100 „
Bergamot oil	3 „
Civet	2 „

Alternative Formula

White ceresine	2 kilos, 250 c.c.
Paraffin	2 „ 250 c.c.
White wax	2 „ 500 c.c.
Beef suet	3 „
Cinnamene	100 grams
Essence of Eucenol	30 „
Geranium oil	60 „
Vanillin	35 „
Heliotropin	10 „
Jasmine pomade base	2 kilos, 500 c.c.
Rose pomade base	1 kilo, 500 c.c.

Rose Cosmetic

Beef suet	8 kilos.
White wax	3 „
Rose pomade base, No. 6	3 kilos, 600 c.c.
Suet infusion of civet	200 grams
Geranium oil	60 „
Cedrat oil	20 „
Oil of cloves	20 „
Bergamot oil	36 „

Orange Cosmetic

Beef suet	8 kilos.
White wax	3 „
1st gum benzoin infusion	3 „
Hard pomade base	4 „
Suet infusion of civet	300 grams
Oil of sweet orange	40 „
Bergamot oil	28 „
Neroli oil	10 „

Alternative Formula

Yellow wax	500 grams
Beef fat	1 kilo.
Orange-flower pomade base (hard)	1 „ 500 c.c.
Oil of sweet orange	3 grams
Bergamot oil	3 „
Neroli oil	1 gram

Violet Cosmetic

Beef suet	4 kilos, 100 c.c.
1st gum benzoin infusion	1 kilo, 500 c.c.
1st suet infusion of orris	3 „ 200 c.c.
White wax	3 „
Cassie pomade base (hard), No. 6	2 kilos, 300 c.c.
Jasmine pomade base (hard), No. 6	500 grams
Rose pomade base (hard), No. 6	400 „
1st suet infusion of civet	100 „
Cedar oil	20 „
Bergamot oil	50 „
Geranium oil	12 „

Alternative Formula

Yellow wax	500 grams
Beef fat	250 „
Cassie pomade base (hard)	250 „
Jasmine pomade base (hard)	150 „
Orris root pomade base (hard)	150 „
Bergamot oil	15 „

Ordinary Salon Cosmetic

Beef suet	12 kilos.
White or yellow wax	3 „
Geranium oil	50 grams
Citronella oil	25 „
Oil of cloves	50 „
Cinnamon oil	50 „
White thyme oil	25 „
Bergamot oil	50 „
Oil of sweet orange	30 „

All required shades of this cosmetic can be prepared.

Ordinary Orange Cosmetic

White wax	187 grams
Beef suet	187 „
Orange pomade base (hard), No. 6	120 „
Oil of sweet orange	31 „

Grape Cosmetic

Beeswax	150 grams
Cocoa butter	150 „
Beef suet	300 „
Geranium oil	20 „
Bergamot oil	10 „
Carmine	30 „

FIXATIVE COSMETICS, OILS AND POMADES 289

Ordinary Rose Cosmetic

White wax	125 grams
Beef suet	375 "
Geranium oil	20 "
Oil of cloves	20 "
Bergamot oil	15 "

Musk Cosmetic

Yellow wax	500 grams
Beef fat	1 kilo.
Rose pomade	500 grams
Gum benzoin	100 "
Civet	1 gram
Bergamot oil	8 grams
Musk	20 "

Bouquet Cosmetic

Yellow wax	1 kilo.
Beef fat	1 "
Rose pomade base (lard)	500 grams
Orange-flower pomade base (hard)	500 "
Cassie pomade base (hard)	500 "
Jasminine pomade base	500 "
Bergamot oil	4 "
Oil of lemon	4 "
" cloves	4 "
" sweet orange	4 "
Musk	4 "

Vaseline Cosmetic

White vaseline	2 kilos 100 c.c.
Japanese wax	600 grams
Ceresine	300 "
Castor oil	850 "
Beef suet	600 "
Rosin	540 "
Bergamot oil	10 "
Palmarosa oil	60 "
Linalol	10 "
Rhodniol	5 "

Lip-salve

To the pomades and cosmetics for the hair and beard, there must be added a hygienic preparation, called lip-salve, used for preserving the lips from too violent action of the air. The preparation of this is extremely simple and needs little care but scrupulous cleanliness, particularly in the mixing. Carmine gives it the rose tint in general use in France, but the pigment may quite easily be left out, and a white salve, which has the same effect without enamelling the lips, prepared.

White Lip-salve

White wax	100 grams
Spermaceti	100 "
Best olive oil	150 "
Oil infusion of bergamot	5 "
" " French geranium	5 "

Best White Lip-salve

White wax	100	grams
Spermaceti	100	"
Oil of sweet almonds	150	"
Bergamot infusion	5	"
Geranium infusion	5	"
Jasmine infusion	2	"

Red Petroleum Jelly Lip-salve (Cerbelaud)

White vaseline	500	grams	500	grams
White beeswax	400	"	—	
Ceresine	400	"	500	grams
Spermaceti	100	"	—	
Liquid paraffin	25	"	5	grams
Casmine	5	"	5	"
Jasmine oil	5	"	5	"
Palmarosa oil	2	"	—	
Rose geranium oil			10	grams

White Tannin Lip-salve

Cocoa butter	300	grams
White wax	100	"
Castor oil	100	"
Oil infusion of tannin	50	"
Gaultheria infusion	12	"

Hair Fixatives or Bandolines

The products known by this name are also fixatives, but without the use of a fat base, which is replaced by gum tragacanth, gum arabic, quince mucilage, or linseed. As these preparations ferment rapidly, it is advisable to add a little benzoic or boric acid.

They are generally perfumed with an infusion or a composite extract, never with an essential oil. The gum tragacanth is pulverised and added to the extract, which is diluted with an excess of alcohol and perfumed; it is then dissolved, not in distilled water, but in an aromatic water. The gum tragacanth is often partly replaced by quince mucilage or that of linseed.

Bandoline—Best Quality

Gum tragacanth	1	kilo.
Alcohol, perfumed with geranium oil	3	litres
Geranium water	5	"

Bandoline—Second Quality

Gum tragacanth	500	grams
Alcohol, perfumed with almond oil	1	kilo. 500 c.c.
Mucilage of linseed	5	litres
Tincture of benzoin	200	grams

Another Formula

Dissolve 20 grams of boric acid in 1 litre of rose-water; add 50 grams of gum tragacanth. After several hours, heat the mixture on a water-bath and filter through gauze. Perfume with 5 grams of oil of rose geranium and 2 grams of phenyl ethyl alcohol, and finally add 100 grams of tincture of benzoin. Triturate in a mortar and pour into pots (Cerbelaud).

Fixatives for the Beard, etc.

To soften the hair of the beard and to render it brilliant, ordinary brilliantines give good results. But to fix the moustache in the fashionable method of the day, special products must be used. These should fulfil the following conditions. It should keep the beard in the desired shape without rendering it sticky, or modifying its natural colour, or damaging the hair. It should not be too strongly perfumed. The substances usually used have been simple solutions of ordinary rosin in alcohol. They fix the beard, but have rather a tendency to cake, and as those who have moustaches know, tend to communicate a disagreeable taste to food and drinks.

More recently a solid paste of a glycerine soap nearly free from water has been used, which is moistened before being rubbed into the hair.

The majority of liquid fixatives of commerce are solutions of well-known adhesives, such as albumen, sugar, gum, extract of malt, etc. In regard to albumen, only the quantity to be used at once should be prepared, as it readily decomposes. In spite of this, it is freely employed where a durable adhesive is required. (It can, of course, be preserved with salicylic acid to some extent.) To cover the somewhat acid odour, it is perfumed with an alcoholic solution of otto of rose or eau de Cologne.

Glucose syrup, gum tragacanth in emulsion in alcohol, and quince mucilage are also used, also perfumed with otto of rose. The following formulæ are examples:—

I		
Gum tragacanth	.....	100 grams
Rose-water	.....	3 litres
Red colour	.....	q. s.
II		
Albumen	.....	100 grams
Glucose syrup	.....	2 kilos.
Rose-water	.....	10 litres
Salicylic acid	.....	30 grams

III

Dextrin	50 grams
Water	800 "
Alcohol	200 "
Otto of rose	2 "

IV

Extract of malt	125 grams
Alcohol	225 "
Rose-water	2 litres
Salicylic acid	10 grams

In concluding these notes on fixatives, we may refer to a cosmetic product which will not be found elsewhere, and which is of some interest, namely hair-curling liquid.

Hair-curling Liquid

There are no substances capable of waving the hair, unless it is naturally curly, and it is necessary to have recourse to curling tongs or similar mechanical contrivances unless this is the case. This, of course, damages the hair. When waving has been brought about by such means, it is protected against atmospheric moisture by the application of the following mixture :—

Powdered borax	600 grams
Gum arabic	80 "
Dissolved in boiling water	18 litres

When cold add camphorated alcohol (75 c.c.) and extract of heliotropin (20 c.c.).

This liquid may be rubbed in the hair before going to bed. The hair whilst still moist is put into curl papers, etc., and in the morning the most obstinate hair will accommodate itself to the hairdresser.

Another Formula

Water	800 grams
Alcohol	200 "
Glycerine	40 "
Borax	20 "
Infusion of benzoin	140 "
Terpineol	20 "
Vanillin	2 "

CHAPTER X

COLOURED COSMETICS

RICE POWDERS, ROUGES, AND PERFUMED STARCH POWDERS

MUCH abuse has been showered on the use of rice powders, etc., in the attentions given to the skin. However, the moderate and intelligent use of such dry cosmetics is more useful than harmful. Pure perfumed rice powder is not a rouge in the proper acceptation of the term, and if it serves to give a smoothness and softness to the skin which is not without attractiveness, its employment is also refreshing and it advantageously replaces in many cases, lycopodium powder, for toilet purposes, to counteract the results of skin massage.

The chief constituent of rice powder is starch, preferably rice starch (whence the technical name) of great purity and brilliance. But commercial starch needs a preliminary treatment to give it the extreme fineness required for use in perfumery. For this purpose, the use of the mill which has already been described will render great service, and it should be used exclusively.

The powder is perfumed before sifting by adding a fixed quantity of calcinated magnesia which has absorbed the essential oils required for that particular perfume.

Various other substances are added to rice powder besides the perfumes, such as oxide of bismuth, zinc white, etc., either to lessen the price, or to increase its adherence to the skin, or to eliminate the pale yellow shade of the rice starch. It is true that this last trouble can be overcome by tinting the substance blue by adding a trace of violet pigment; or even by the addition of eosin the rice powder can be given a red tint which imitates the natural flush of the human face, but here the addition must be made with great care, or the colouring of the face will be somewhat too marked.

The chief objection to the use of rice powder lies in these additions made to it. But as they are not absolutely indispens-

able to the powder, it seems better to forgo the use of these ingredients rather than to use a powder that is not perfectly pure, or at most containing a little magnesium carbonate, talc, or calcium sulphate, which are inoffensive. Subject to this, there follow the formulæ of a certain number of perfectly harmless rice powders.

FORMULÆ FOR THE PREPARATION OF RICE POWDER

General Formula

Rice flower	7 kilos. 500 c.c.
Cornflour	3 .. 500 ..
Magnesium carbonate	3 .. 500 ..
Powdered orris	1 kilo.

Many different powders may be obtained by adding various perfumes to this mixture. Where no particular bouquet is required, the following perfume may be used:—

Bergamot oil	100 grams
Linalyl acetate	10 ..
Oil of roses	10 ..
„ sweet orange	25 ..
Santalol	15 ..
Palmarosa oil	15 ..
Geraniol	50 ..
isoEugenol	20 ..
Musk infusion	100 ..

Add 150 to 200 grams of this perfume to the above powder.

Ordinary Rice Powder

Starch flower	5 kilos.
Magnesium carbonate	500 grams
Calcium sulphate	3 kilos. 500 c.c.
Talc	1 kilo.
Powdered orris	200 grams
Bergamot oil	32 ..
Oil of lemon	10 ..
1st infusion of musk pods	6 ..

Mix the oils and the infusion with the magnesium carbonate, then triturate the whole, pass through a fine sieve and pack in boxes.

Another Formula

Flour	8 kilos.
Calcium sulphate	2 ..
Bergamot oil	20 grams
Oil of lemon	22.5 ..
„ cloves	8 ..
Cinnamon oil	10 ..

Treat as above.

Another Formula

Flour	10 kilos.
Calcium sulphate	1 kilo. 250 c.c.
Powdered orris	1 „ 250 „
Bergamot oil	5 grams
Oil of lemon	4 „
Geranium oil	2.5 „
Neroli oil	1 gram

Indian Rice Flour Powder

Starch-flower	19 kilos.
Venetian tale	2 „ 500 c.c.
Frangipani powder base	1 gram
Musk	75 grams

Best Rice Powder (Rose)

Riceflour	2 kiloy.
Cornflour	2 „
Magnesium carbonate	1 kilo.
Rose oil	4 grams
Rose geranium oil	4 „
Oil of cloves	2 „
Santal oil	2 „
Cedar oil	3 „

Best Rice Powder (Millefleurs)

Riceflour	2 kilos.
Cornflour	2 „
Magnesium carbonate	1 kilo.
1st infusion of gum benzoin	30 grams
„ „ of musk-pods	10 „
Rose geranium oil	20 „
Oil of cloves	8 „
Bergamot oil	15 „
White thyme oil	3 „
Oil of bitter almonds	1 gram

Best Rice Powder (Violet)

Riceflour	2 k 300 g.
Cornflour	2 „
Magnesium carbonate	1 kilo.
1st infusion of cassia	50 kilos.
Bergamot oil	40 „
Neroli oil	5 „
1st infusion of musk-pods	60 „
Orris oil	10 „

Best Rice Powder (Bouquet)

Riceflour	2 kilos.
Cornflour	2 „
Magnesium carbonate	1 kilo.
White thyme oil	3 grams
Bergamot oil	3 „
Oil of cloves	3 „
„ petitgrain	2 „
Geranium oil	12 „
1st infusion of musk-pods	3 „

Best Rice Powder (Marichale)

Riceflour	2 kilos.
Cornflour	2 "
Magnesium carbonate	1 kilo.
1st vanilla infusion	2 grams
1st Tonquin infusion	2 "
1st civet infusion	2 "
1st musk-pod infusion	2 "
Cinnamon oil	2 "
Neroli oil	2 "
Oil of cloves	2 "
Bergamot oil	10 "
Orris oil	4 "

Mimosa Powder

Riceflour	7 kilos.
Cornflour	3 " 500 c.c.
Magnesia	3 " 500 "
Finely powdered chalk	2 "
Orris powder	1 kilo.
Mimosa oil	50 grams
Tincture of vanillin	25 "
Bergamot oil	10 "
Artificial rose oil	1 gram
" neroli oil	1 "
Infusion of gum benzoin	80 grams
" of musk	20 "

Rice Powder (Patchouli)

Riceflour	2 kilos.
Cornflour	2 "
Talc	1 kilo.
Patchouli oil	20 grams
Artificial rose oil	15 "
" neroli oil	10 "
Bergamot oil	30 "
Tincture of musk	20 "
Terpineol	5 "

The use of terpineol requires care. After a certain time powders which are scented with it often acquire a musty smell.

Soft Powder

Riceflour	1 kilo. 500 c.c.
Talc	1 " 500 "
Cornflour	750 grams
Magnesia	750 "
Geraniol	5 "
Oil of rosewood	5 "
Artificial oil of roses	1 gram
Bergamot oil	15 grams
Tincture of musk	10 "

Muguet Powder

Cornflour	1 kilo.
Magnesia	800 grams
Zinc white	400 "
Muguetine	8 "
Linalol	3 "
Infusion of gum benzoin	15 "
Vanillin	1 gram

Oatmeal powder, prepared as follows, is widely used in England.

Oatmeal	5 kilos.
Powdered orris	1 gram
Bergamot oil	25 grams
Oil of lemon	10 "
Artificial mandarin oil	5 "

ROUGES¹

Although this work is intended to deal only with perfectly harmless substances made by the perfumery trade for daily use, it is impossible to omit entirely reference to the manufacture of rouges which are used to increase the natural brilliance of the colouring of persons who have to appear on the stage or in large halls under the brilliant glare of footlights, or to repair the ravages of time and disease on the complexions of coquettes. However, all rouges have an insuperable disadvantage: they close the pores of the skin and stop perspiration. It thus follows that those who have to make use of such preparations should remove them as quickly and completely as possible on their return to ordinary life. Only formulæ for rouges which do not contain any real toxic substances are included here. The colouring will perhaps be less brilliant, but the health will be a great deal less affected. White lead, zinc white, barium white, and mineral greens are entirely neglected, and only the carbonates of calcium and magnesium, bismuth subnitrate, powdered pumice-stone, talc, vegetable carbon, safflower, cochineal red, and some alcoholic solutions of artificial colouring matters in very small proportions are used in these formulæ. There are three kinds of rouge: dry rouge, wet rouge, and greasy rouge. Dry rouges are undoubtedly the least offensive, but unfortunately they do not adhere properly, and the thoughtless user dislikes having recourse to them. Besides, when coloured they easily stain dresses which are often costly and delicate.

Dry White

Impalpable pumice-stone	1 kilo.
calcium carbonate	1 "
Geranium oil	5 grams
Bergamot oil	10 "

¹ The word "rouge" is here used irrespective of the colour, and as equivalent to the French "fard."

Dry Rose

Impalpable pumice-stone	2 kilos.
Calcium carbonate	1 kilo.
Alcoholic solution of eosin	10 grams
Bergamot oil	10 "
Gum arabic	100 "

Dry Rouge

Impalpable pumice-stone	1 kilo.
Calcium carbonate	2 kilos.
Gum arabic	100 grams
Eosin	30 "
Solution of carmine	200 "
Geranium oil	20 "

Dry Black

Lamp black	1 kilo.
Gum arabic	30 grams
Bergamot oil	4 "

The difficulty in manufacturing dry rouges lies in obtaining the requisite degree of dryness. The personal experience of the perfumer will be the best guide for this.

Luminous Rouge

Pumice-stone	100 grams
Phosphorescent zinc sulphide	200 "
Lithium carbonate	25 "
Carmine	2 "

The luminous brilliance of this rouge produces a very curious effect in the dark or shadow. The lithium salt is used to mask by its reflection the somewhat sepulchral green of the sulphide (*Parfumerie française*, 1895).

Wet rouges are mixtures of pigments and liquid perfumes often with the addition of glycerine, the viscosity of which retards the deposition of the particles in suspension.

Wet White

Bismuth subnitrate	1 kilo.
Glycerine	1 "
Rose-water	500 grams
Orange-flower water	500 "

Wet Rouge

Eosin solution	30 grams
Gum arabic	30 "
Rose-water	$\frac{1}{2}$ litre
Orange-flower water	$\frac{1}{2}$ "
Glycerine	1 "

Another Formula

Rose-water	3 litres
Ammonium hydrate	30 grams
Geranium oil	10 "
Alcohol	$\frac{1}{2}$ litre
Carmine	30 grams

Theatrical Rouge

Carmine	95 grams
Ammonia	50 "
Rose-water	1 litre
Alcohol	1 "

Grind the carmine in a marble mortar, then add ammonia and mix well; add 500 grams of the rose-water and shake until the carmine is well dissolved; then add the other 500 grains of rose-water, mix well, and add 1 litre of alcohol. Allow the mixture to stand for twelve hours, then filter and bottle.

Liquid Blue for the Veins

Solution of Victoria blue	400 grams
Gum arabic	100 "
Orange-flower water	1 litre
Rose-water	500 grams

Greasy rouges are made with a base of fatty pomade of animal origin mixed with mineral fats. The powders are added to the melted fat mixture, which is stirred while cooling. It is perfumed when cool but still liquid.

Greasy White

Bismuth subnitrate	1 kilo.
Petroleum jelly	500 grams
Neroli oil	10 "

Greasy Rose

Carmine	17.5 grams
Tallow	600 "
Ceresine	100 "

Perfume as desired.

Greasy Rouge

Carmine	70 grams
Tallow	600 "
Ceresine	100 "

Perfume as desired.

"Sympathetic" Rose

Oil of bitter almonds	1 kilo. 800 c.c.
Spermaceti	300 grams
White wax	300 "
Distilled water	500 "
Alloxane	50 "
Artificial oil of roses	10 "
Bergamot oil	50 "
Oil of lemon	20 "

The colouring matter here is alloxane, a white, crystalline powder made from uric acid. This cream is applied in a thin

layer; under the action of the air, the alloxane in it produces a delicate red on the skin. The base of spermaceti and wax is made first, part of the melted mixture is placed in a heated mortar and the alloxane added; the whole is then ground fine. Meanwhile, the oil of almonds has been heated to the same temperature, and is then added with the perfumes to the mixture in the mortar; finally the distilled water is added in a thin stream, shaking continually. A paste is obtained of the consistency of butter, which is placed in small china pots.

Persian Rose

Lard	1 kilo.
White petroleum jelly	1 "
Alloxane	30 grams
Orris oil	10 "

The alloxane is ground in a mortar with part of the lard, melted, and the other ingredients are then added.

Greasy Blue for the Veins

Tallow	600 grams
Ceresine	100 "
Ultramarine	500 "

Perfume as desired.

Greasy Black

Petroleum jelly	500 grams
Ivory black	1 kilo.
Ceresine	200 grams
Lavender oil	15 "

PERFUMED FARINA MEALS

The farina of bran and sweet or bitter almonds are true hygienic products, of great value for baths and lotions.

Bran is well known as a by-product in the manufacture of cornflour; it is only necessary to reduce it to an impalpable powder to render it fit for use in perfumery. As for the farina of sweet or bitter almonds, it is obtained by the trituration of the residue of almonds which have already been used for the extraction of almond oil. To the almond oil-cake it is usual to add bran, orris, and sometimes a little powdered soap. If the perfumed powder is to be used to replace toilet soap for the hands, a little finely powdered pumice-stone may be added.

Best Almond Powder

Almond meal	10 kilos.
Oatmeal	4 „
Powdered soap	1 kilo.
Bergamot oil	70 grams
Neroli oil	10 „
Cedrat oil	20 „
Oil of cloves	20 „
Bergamiol	20 „

Superior Almond Powder

Almond meal	5 kilos.
Bran	5 „
Powdered soap	1 kilo.
Ordinary flour	3 kilos.
Bergamot oil	150 grams

Ordinary Almond Powder

Bran	10 kilos.
Ordinary flour	4 „
Bergamot oil	100 grams
Oil of cloves	20 „

Hair Dyes

Dyes are used to restore the original colour of the hair. They are very numerous and, as is natural, they all claim to be entirely harmless. How far this claim is justified will be seen.

The natural colour of the hair depends on its chemical composition. Thus many analyses have been made with regard to this subject. Black is produced by the presence of much iron and little sulphur; red by equal amounts of iron and sulphur; blonde by little iron and much sulphur; white by the absence of both iron and sulphur.¹

It might be concluded from this that it would be possible to restore the original colour of the hair without special preparations by feeding it with substances containing these two elements. However, this is not the case, and experiments carried out on men have yielded negative results, although in the case of birds fairly promising results have been obtained. Nevertheless, the Chinese are said to have possessed for thousands of years the secret of preserving the natural colour of the hair until a very great age, and to have attained this object by drinking waters containing iron.

In Europe, matters are not so advanced, and there is no other means of obtaining this result except by using dyes. Unfortunately, among these there are a great number that are harmful.

¹ This statement must be taken with considerable reserve, and is mainly conjectural.

not only to the scalp, but also to the general health. The Biological Society of Paris is specially concerned with the dangers caused to health by the use of certain hair dyes. Dr. Laborde has shown clearly that the habitual use of certain cosmetics not only accounts for local troubles such as eruptions on the head, face, and hands, but also produces blood poisoning. On this point, he reports the case of a woman of fifty who used hair dye and who complained of violent digestive troubles. At first, the symptoms appeared every three weeks, and then very fortnight, and finally every week, and were accompanied by headaches, nausea, and sickness. This woman, who suffered at the same time from fits, consulted two specialists, whose treatments did not cure her. She then consulted Dr. Laborde, who was immediately struck by the beauty of her jet-black hair, which was without a thread of silver. He questioned her about it, and discovered that she used a certain very fashionable dye and that she applied it every week or fortnight. He told her to stop using this dye, which was paraphenylenediamine, and her cure was rapid. Experiments made on animals by Dr. Laborde confirmed his views; the same symptoms showed themselves regularly, such as vomiting, contraction of the muscles, and stiffening of the limbs. A strong dose of "para" resulted in death in from fifteen days to three weeks, and dissection showed that the blood, the heart, the kidneys, and even the muscles were colored black. In the course of oxidation of the body it forms, in fact, besides the solid matter of the pigment, a certain quantity of quinone dianide, a violent poison the action of which seems to vary according to the constitution. Consequently, it was proposed to forbid the sale of dyes based on synthetic organic colours, but this measure was never adopted. It seemed to be proved, in fact, that all risk of accident could be avoided when using "para" by careful washing after applying the dye. This will be considered later.

The hair dyes that are actually found in commerce usually have as a base a salt of lead, bismuth, silver, copper, or iron. There are also extracts of walnuts and solutions of organic products, such as paraphenylenediamine, which has been mentioned above.

As those dyes with a lead base are very poisonous and forbidden¹ by law, they need not be mentioned here.

Dyes with a bismuth base are very expensive, besides, their

¹ That is, in France.

action is not always certain, especially when used for the beard. Indeed it must be noticed that the hairs of the beard differ from those of the head in their constitution.

Dyes with a silver salt as base are said to be perfectly harmless. They produce an immediate effect which lasts for several weeks. It is true that they give the hair a peculiar glint. This can be remedied by the addition of a little copper sulphate, but this is not to be recommended.

DYES WITH A SILVER SALT BASE

These dyes are usually composed of two solutions contained in separate bottles. Some formulæ which are perfectly harmless follow.

1st Solution

Alcohol	750 c.c.
Water	2 litres
Pyrogallol	25 grams

Suitable for all shades.

2nd Solution for Brown Dye

Silver nitrate	125 grams
Rose-water	1 l. 500 c.c.
Ammonia	250 grams

2nd Solution—for Black Dye

Rose-water	1 litre
Silver nitrate	125 grams
Ammonia	350 "

2nd Solution—for Blonde Dye

Rose-water	1 l. 400 c.c.
Silver nitrate	25 grams
Ammonia	100 "

Directions for Use.—Before applying this dye, carefully wash the beard or hair with soap and water.

When the hair is dry, damp down to the roots with No. 1 solution, using a small brush, taking care to divide the locks. After five or ten minutes, apply No. 2 solution with another small clean brush, being careful not to touch the skin, or it will be blackened.

When the hair is uniformly dyed, wash it carefully and put a little brillianine on. The treatment should be used every two or three weeks.

Other dyes with a silver base are prepared as follows :—

<i>Solution No. 1</i>		<i>Black</i>	<i>Solution No. 2</i>	
Pyrogallie acid.....	10 grams	Silver nitrate	48 grams	
Rose-water	250 „	Rose-water	400 „	
Alcohol, 95 per cent.	250 „	Liq. Ammonia	100 „	
<i>Brown</i>				
Nitrate of silver	32 grams	Pure wood vinegar.....	250 grams	
Rose-water	450 „	Rose-water	250 „	
Liq. ammonia	50 „	Pyrogallie acid	7 „	
<i>Blond</i>				
[Same as for Brown]		Saturated solution of potassium sulphide ...	250 grams	
		Rose-water	250 „	
<i>Brown Based on Permanganate</i>				
Permanganate of potash			200 grams	
Rose-water			1 litre	
Orange-flower water			400 grams	

Soak a piece of linen or a soft brush in the liquid, and moisten the hair, preferably washed first with weak soda solution, taking care not to touch the skin, which will be dyed brown by the permanganate. This dye keeps for a considerable time, and is not dangerous so long as it is used in reason and one is satisfied with increasing the tint to a lightish brown.

TURKISH DYES

To dye their hair the Turks have from time immemorial used ointments, which they term *raslicks*, and which they prepare in the following manner. Crushed gall nuts are heated in a copper vessel, powdered, and made into a mass with a little water. The mass is then heated, and when it is homogeneous it is incorporated with a little heated iron or copper filings. The finished product is a thick paste with a characteristic odour. The proportions used are as follows :—

Gall nuts	200 grams
Iron filings	5 „
Copper filings	0.2 gram
Musk	0.2 „

The hair is moistened with this paste, which is allowed to remain in contact with it for two hours. It is then washed away with plenty of water. These dyes are but rarely used in Europe on account of the difficulty of application and the fugitive nature of the results.

BISMUTH DYES

These dyes have been recommended by Naquet, and certainly have some value. Cerbelaud gives the following formula for a typical dye:—

Citrate of bismuth	50 grams
Rose-water	200 „
Water (distilled)	50 „
Alcohol, 90 per cent.	700 „

Ammonia is added till the solution is complete and clear. In the evening the hair, preferably well washed with soap to remove fat, is rubbed with this mixture, and in the morning it is treated with a 30 per cent. solution of hyposulphite of soda.

VEGETABLE DYES

One of the best vegetable dyes is that obtained from henna and the leaves of the indigo plant.

Henna powder is prepared by crushing the leaves of a small shrub of the *Lawsonia* species, which is found in Arabia and Egypt. Employed by itself, henna dyes the hair a mahogany red, but when mixed with powdered indigo leaves, shades are obtained from pale brown to black. The hair, at the same time, acquires great brilliancy and strength. The dye is quite inoffensive and does not attack the skin. Its effect lasts for months and it causes the hair to have a most natural colour. But its application demands considerable patience and skill. It should be applied in a room warmed to 25°, as the colour does not develop well in the cold. Plenty of warm water should be at hand for washing the hair. In an operation at least 100 grams of the mixed powder are used, and this should be perfectly dry. The two ingredients should be mixed when required for use. For a light shade of brown, use 80 grams of indigo leaves and 40 grams of henna; for dark brown to black, use 90 grams of indigo leaves and 30 grams of henna.

The powders are mixed with 500 c.c. of water, which is added slowly and carefully, so as to make the powders into a smooth, creamy liquid, which is then applied to the hair, previously freed from fat by washing with soap and water.

For dyeing long hair in the case of ladies, it is best to plait and moisten it with the paste, taking care to work it well in with the hands, so that it penetrates into the interior of the

plaits by the pressure of the hand. The plaits so treated are fixed round the head, and a new layer of the dye is worked over the hair so as completely to cover it. The head is wrapped in a warm linen cloth and the covering and paste kept on for two hours in the case of brown, or three to four hours in the case of black being desired. The hair is then well washed with a copious supply of water poured on the top of the head, the hair being freely combed all the time. This washing should last for at least half an hour, or until the water comes away clear and untinted. But it is not before at least six hours that one can correctly gauge the shade obtained, so that it is preferable to operate in the evening. If the hair when dried is dull instead of bright, something has failed, and the operation must be repeated. It is apparent from the above indications that dyeing with henna-indigo requires considerable patience, hence its infrequent use.

To facilitate the action of henna, and especially to shorten the time required, various vegetable colours are sometimes added. Cerebelaud gives the following as the composition of one of these vegetable dyes :—

Powdered henna	50 grams
Powdered gall nuts	30 "
Powdered walnut leaves	20 "
Alcohol, 90 per cent.	80 c.c.

Macerate the powders in the alcohol for four or five days, filter; allow to drain, and on the residue pour 100 grams of rose-water, and finally add boiling water, so that the filtrate measures 300 c.c. Then add 6 grams of glycerine to 0.6 gram of oil of ylang-ylang dissolved in 5 to 10 c.c. of alcohol. The liquid is then again filtered, and is applied to the hair freed from fat by washing with soap and water. The hair is then washed with 1 per cent. ammonia solution, and a second application is made.

"Kohl" Black Dye

Chinese ink (best quality)	60 grams
Gum tragacanth	100 "
Rose-water	1500 c.c.
Alcohol (perfumed with verbena)	200 grams

This dye is not very stable, but is harmless.

Walnut Extract

Extract of walnut shells form an absolutely harmless dye, the manufacture of which is quite easy. When the nuts are

ripe, the green outer shells are taken and crushed in a mortar, and water in which is dissolved 1 per cent. of table salt is added. At the end of three days the mixture is transferred to a boiling vessel, and the level of the liquid is noted, as the loss due to evaporation must be continually replaced, and the liquid heated for four to five hours almost to boiling. It is then allowed to cool, and the liquid expressed from the shells either by a press or by twisting the residue in a cloth. The separated liquid is replaced in the boiler and evaporated to a quarter of its volume. When sufficiently evaporated the extract is allowed to cool, and 15 per cent. of alcohol (95 per cent.) is added and the liquid transferred to bottles. It is perfumed with a mixture of oil of bergamot (10 parts), balsam of Peru (3 parts) and sandalwood oil (2 parts).

It is useful to add to the walnut extract a little pure glycerine, which softens the hair. Before applying the dye, the hair must be freed from fat. Its effect is, at first, to produce a somewhat yellowish effect, finally giving the hair a good deep black colour. This extract loses its effect after a certain time, so that many commercial so-called walnut extracts are adulterated with copper chloride, which is objectionable. Alum, which is quite harmless, is effectual as a preservative. It may be added as follows :—

Green walnut shells	950 grams
Alum	60 "
Distilled water	240 "

After standing for forty-eight hours, the extract is expressed as above described, and 600 grams of 95 per cent. alcohol are added. Further dilution can be made according to the shade required.

A product which is improperly and fraudulently sold under the name of extract of walnuts is a silver dye made up as follows :—

Glycerine	1 kilo.
Distilled water	250 grams
Pyrogallie acid	50 "
Nitrate of silver	15 "

"Blond de Florence"

Twenty-five years ago, it was fashionable to dye the hair to the shade known as "Blond de Florence." It is said that in America sulphide of cadmium was used for this purpose, but whether this be so or not, peroxide of hydrogen is the substance usually employed. This body must be kept in tightly corked,

strong vessels, in a cold place and away from the light, otherwise oxygen is given off and the liquid loses its strength. A good formula is the following :—

Peroxide of hydrogen (10 volumes)	1000 c.c.
Solution of ammonia (25 per cent.)	15 „

The liquids are mixed and kept in tightly corked blue or brown bottles. The hair is well washed several times with this liquid until the desired shade is obtained. Whatever shade has been obtained, it is necessary, in order to preserve the effect, to keep the hair a little “fatty,” as the ammonia “defats” the tissue. Pomade or aromatic oil is used for this purpose.

Organic Chemical Dyes

For several years the use of organic chemical dyes has been on the increase. This observation applies especially to the paraphenylenediamine dyes.

[It cannot, however, be too strongly emphasised that considerable risk is incurred by the use of this substance, as skin affections are often produced by it, and several actions for damages have recently been successfully brought against hair-dressers in England.]

It was in 1883 that Monnet proposed the employment of coal tar dyes for this purpose. Paraphenylenediamine occurs in the form of a nearly colourless mass, soluble in water. It condenses under the influence of oxidising agents and gives an insoluble black colouring matter. To facilitate this oxidation, it is sufficient to add to the solution a small amount of an oxidising agent such as hydrogen peroxide. Erdmann recommends the following formula :—

Paraphenylene diamine	20 grams
Caustic soda	14 „
Water	1000 c.c.

This solution is harmful—apart from what has been said above—in that the caustic soda acts adversely on the hair and skin. Onimus and Villedieu prefer bichromate of potash as the oxidising material and add diamidophenol to obtain pale shades :—

	Black.	Chestnut.	Red-blond.
Paraphenylenediamine	20 grams	5 grams	2 grams
Bichromate of potash	5 „	5 „	1 gram
Diamidophenol	—	—	10 grams
Water (perfumed if desired)	1000 c.c.	1000 c.c.	1000 c.c.

A paler blond shade is obtained by diluting the "red-blond" dye. It is sufficient to leave the moistened hair exposed to the atmosphere for fifteen minutes for the tint to be developed. It is then well washed with water.

Cerbelaud's formulæ are identical, except that he employs the hydrochloride of paraphenylenediamine. Guesquin advises the addition of a little bicarbonate of soda, to render the liquid alkaline. The dye containing bicarbonate of soda and hydrogen peroxide, contains 1 to 2 grams per litre of the hydrochloride for pale shades, 2 to 3 grams for chestnut shades, and 3 to 5 grams for black dye. After application and drying, the hair is washed with slightly alkaline water, and then with ordinary water. Guesquin's formulæ give as good results as are to be obtained with this substance. The following formulæ have also been published :—

A.—Progressive

Paraphenylenediamine	10 grams
Distilled water	960 "
Alcohol, 90 per cent.	20 "
Glycerine	39 "

B.—Progressive

Paraphenylenediamine	10 grams
Rose-water	930 "
Otto of Rose	0.25 gram
Tincture of patchouli (1 in 5)	5 drops
Synthetic ylang-ylang	20 "
Alcohol, 95 per cent.	50 grams
Glycerine	20 "
Liquid ammonia	10 "

Apply the dye with a soft brush (three to five applications are sufficeit it). For Formula B defatting of the hair is not necessary.

C.—Instantaneous

This is prepared in the following manner: Dissolve 20 grams of paraphenylenediamine in 250 grams of boiling water, add 750 grams of water and 5 to 10 grams of ammonia. The solution is applied to the hair after washing, and immediately afterwards a solution of 10 vols. of acidified hydrogen peroxide is applied. Fine tints may be obtained by this method.

D.—Instantaneous in Graduated Shades

The following formulæ are used :—

	Black,	Chestnut,	Blond,
Paraphenylenediamine hydrochloride	20 grams	5 grams	1 gram
Diamidolphenol	—	5 "	1.5 grams
Distilled water	1 litre	1 litre	1 litre

One of the above liquids is applied first, then the colour is brought out by means of an oxidising agent; hydrogen peroxide, or a solution of potassium bichromate (5 grams per litre).

A single solution can also be prepared by mixing at the time of use equal parts of the dye base and the oxidising solutions.

Attempts have been made to replace the paraphenylenediamine by various similar organic substances such as para-aminophenol, metol, or para-aminophenyltolylamine, but these substances, which are more or less irritant to the skin, have not given good results. Only the use of a sulphonate base, especially monosulphonate of para-aminophenol, and orthoaminophenol, together with hydrogen peroxide, gives various shades which are harmless to the skin.

These dyes (German Patent 1903 and French Patent 1904) were used commercially under the name of *eugatol*. This was composed of an aqueous solution of sodium salts of these two sulphonate derivatives: but four or five applications were necessary, thus rendering it less convenient than dyes based on "para."

The same person again proposed (1904) the use of a solution of 1:2-naphthylenediamine or its sulphonate in 2 per cent. alcohol with the addition of a little alkali, such as ammonia, and finally 2 per cent. hydrogen peroxide. The dyes thus obtained were unaltered by washing, brushing, or by light. The formulae recommended are as follows:—

(A) A solution of 2 per cent. amine in alcohol diluted with a little ammonia; adding before use an equal quantity of 3 per cent. hydrogen peroxide.

(B) An aqueous solution of 4 per cent. sodium salt of 1:2-naphthylenediamine-4-sulphonic acid; just before use an equal quantity of 3 per cent. hydrogen peroxide is added. The hair is soaked with this, and when dry it should be washed.

Neither of these has succeeded in replacing paraphenylenediamine, the preparations of which, if carefully applied, are no more harmful than these others.

"OREAL" PHENOL DYES

The study of the colour reactions of the phenol group has enabled Schüller to define accurately the conditions of the formation of colouring matter between the polyphenols and metallic

salts; and consequently to defer the precipitation until a convenient time. Oreal dyes (French Patent 383920) are composed of a mixture of a reducing agent with a solution of one of the phenol group and a metallic salt in such proportions as to prevent them reacting in the solution containing an excess of the reducing agent. In the air, however, this excess is oxidised more or less slowly, and colouring matter is formed.

In this way, certain amidophenols, phenotriol (1 : 2 : 3), hematoxylin, etc., can be used in conjunction with the salts of iron, copper, nickel, and cobalt. All the reducing agents can be used. Sulphurous anhydride, or the sulphites, methanal, and methanoic acid are to be preferred. The reducing agent is first allowed to react with the phenol or the metallic salt, then the other is added, using an aqueous or alcoholic solution. By varying the nature and quantity of metallic salts, used either singly or in combination, all blonde or black tints can be obtained; further, certain synthetic colours may be added for shading purposes. It is also permissible to add a little of a solution of a mixture of glycerine ethers, fatty acids in an organic solvent, or of an aqueous solution of sulphonated fats.

The dyes thus prepared are not only very convenient to use, since they only require one application, but also they are not poisonous, since they contain no lead or paraphenylenediamine, and the chromogene is always present in an excess of salt. The shades obtained are fairly permanent, since when they are well made the precipitation only occurs during the oxidation.

Dye to Whiten the Hair

To change grey hair into snow-white hair the use of hydrogen peroxide is not advisable, for it leaves the hair a yellowish shade. The treatment should be as follows: the hair is first well shampooed and dried. It is then damped with a 6 per cent. solution of warm potassium permanganate and allowed to dry. It is then washed with a 10 per cent. solution of sodium thiosulphate, and immediately after with a little sulphuric acid. This treatment must be repeated several times.

CHAPTER XI

DEPILATORIES

DEPILATORIES are chiefly used by women to remove superfluous hair, especially from the face. Large quantities are exported to the East, where there is a continual demand and French productions enjoy a good reputation. In the East, calcium hydrosulphide has long been used as a depilatory. It rapidly transforms the hairs into a gelatinous mass and only attacks the skin slowly.

Under a patent of Dr. J. Pert strontium hydrosulphide is used for the same purpose, but this substance rapidly deteriorates. To assure the stability of the calcium salt, lime is slaked with a solution of 5 to 25 per cent. of sugar, and the calcium saccharate thus obtained is ground into small lumps and saturated with hydrogen sulphide. This product must be kept away from light and air.

For use, this is mixed with talc, for example, and perfumed so that the final product contains 4 to 6 per cent. as a base. It is diluted with water until it forms a paste, which is applied to the spot from which it is required to remove the hairs. After five or ten minutes it is removed by scraping or by washing, and the hairs disappear at the same time without damaging the skin. As this substance is not poisonous, it is absolutely harmless, even if there are cuts in the skin: it acts, indeed, as an antiseptic.

The various series of depilatories are as follows:—¹

Sodium Sulphide Depilatories

	Sodium mono-sulphide.	Pulverised quicklime.	Starch	Water.
A	6	10	10	—
B	3	10	10	—
C	100	250	235	500
D	10	10	20	—
E	3	3	6	—
F	2	10	10	—
G	5	—	5	50

¹ According to Chaplet, *Perfumerie Moderne*, 1912.

Crystalline sodium monosulphide in transparent masses, coloured pale green by impurities, is used, as it is bought very cheaply. The product represented by the formula $\text{Na}_2\text{S} + 9\text{H}_2\text{O}$ is prepared by bubbling a current of hydrogen sulphide through a solution of soda. Owing to its unpleasant smell it must be kept in carefully corked bottles. Eventually it will corrode the skin, but as it is only used a very few times its employment offers no serious inconveniences.

Arsenic Sulphide Depilatories

Rushma has been used in the harems of the East for very many years to remove the hair from the private parts of women. It is only prepared at the time of using by crushing a mixture of slaked lime and orpiment (arsenic bisulphide) with enough water to form a cream. The formulæ for this vary, but suitable proportions are 250 grams of orpiment to 1500 grams of lime. Thus prepared, the cream is applied to the skin and kept there about five minutes (until a painful feeling is produced). The surface is then scraped with a blunt blade, like a paper knife, washed with plenty of water, wiped, and a little petroleum jelly put on the skin.

The most useful formulæ are :—

Orpiment	1	1	15	4	12	30	4	15
Quicklime	16	10	30	30	30	60	30	60
Starch	10	—	—	—	—	—	—	10
Soda lye 36° B	—	—	500	—	125	—	—	—
Pulverised gum	—	—	—	60	—	—	—	—
Potassium nitrate	—	—	—	—	4	8	—	—
Powdered orris	—	—	—	—	—	60	60	—
Sulphur	—	—	—	—	4	8	—	—
Formula according to.....	Plenk	Plater	Tissandier	Delaroix	Collez	Villon	Debay	Cerbelaud

The substances are mixed at the time of use and made into a paste with water. Tissandier's formula requires heating before use; this should follow immediately after manufacture.

Rushma is still used in the East, but is completely abandoned here on account of serious accidents which have followed its use. Indeed, if pure orpiment is harmless it is not so when it contains arsenious acid, which is a virulent poison liable to

occasion serious accidents by its use. Besides the action of lime on the sulphide forms this acid :—



Gélis (French Patent 84491, 1869) has suggested the use of mixtures of two sulphides as a base for a depilatory. For example, arsenic and potassium, arsenic and sodium, arsenic and ammonium, arsenic and calcium, barium, or strontium. The mixture of this kind which gives the best results is as follows :—

Orpiment	10 grams
Sodium sulphide	40 "
Water	50 "

Blinn d'Omay's (American Patent 707953, 1901) mixture with sodium hyposulphite as base should also be mentioned.

Arsenic sulphide	8 to 20 grams
Sodium hyposulphite	10 grams
Quicklime	80 to 90 grams

Depilatories with an Alkaline Earth Base

The best known of these has a base of sulphuretted calcium sulphide, recommended by Martens Boettger and various others. The chief method for its preparation is as follows.

A milk of lime is prepared with 3 parts of water to 2 parts of recently slaked lime, and a current of hydrogen sulphide gas is bubbled through the paste, which is shaken regularly, until it is completely saturated. In this way, a paste is obtained, often of a greenish colour on account of impurities in the lime, which on standing separates into a white deposit and a residual colourless liquid. For use, it is stirred and a layer applied to the skin and scraped after five or ten minutes, when the hairs will have disappeared.

(Erbelaud advises mixing the sulphuretted sulphide with an equal weight of starch at the moment of using, or the preparation of the following :—

Sulphuretted sulphide	40 grams
Pulverised zinc oxide	10 "
Starch	10 "
Glycerole	20 "
Terpincol	1 gram

Barium sulphide forms the active element of several depilatories.

Formula.	Barium sulphide	Zinc oxide.	Starch.	Calcium sulphide.	Solution of gum.
Call Anderson	6	24	—	—	—
La Nature	10	5	5	—	—
Fervil	5	5	5	5	10
Bull. pharmacologique	6	20	5	—	10

The whole is boiled to produce a creamy starch. Such a mixture has no depilatory action.

Strontium sulphide used by Lutge is made according to the following formula :—

Strontium sulphide	15 grams
Starch	20
Water	80

Thallium Salt Depilatories

It is said that the application of a strong pomade of thallium acetate to the skin rapidly promotes complete baldness; hair, eyelashes, eyebrows, beard—all the hair falls out, while there is an acceleration of the pulse and the presence of albumen in the urine. It is apparent that thallium salts are very strong depilatories. But their action is only temporary; after a month the hair reappears. The action is due to the thallium, since for a period of about twenty days after use traces of this element can be found spectroscopically in certain fluids of the body.

In spite of the extent of the action of thallium salts, Dr. Sabouraud advocates their careful use as depilatories. In weak doses thallium acetate is a harmless depilatory provided that it is used as a pomade according to this formula :—

Thallium acetate	3 grams
Zinc oxide	25
Laqoline	50
White petroleum jelly	200
Rose-water	50

By applying a piece of this cream as large as a pea every evening to the growth on the lip, after a year or sometimes more the hair will slowly but surely diminish in length and in thickness.

CHAPTER XII

SMELLING SALTS, TOILET VINEGARS, AND SIMILAR PREPARATIONS

Toilet Vinegars

UNDER the name of Toilet Vinegars, the perfumer prepares toilet waters slightly acidulated with vinegar or acetic acid or flavoured with acetic ether. Thanks to its refreshing properties, toilet vinegar is largely employed, not only in Europe, but also in tropical countries. As tastes vary considerably, they are variously perfumed, with, for example, rose, violet, peau d'Espagne, etc. The following are typical formulæ:—

Toilet Vinegar

Alcohol, 55 per cent.	16 l. 725 c.c.
Infusion of cassia, No. 2	900 grams
" vanillon, No. 1	225 "
" vanilla, No. 1	75 "
" benzoin, No. 1	375 "
Acetic ether	150 "
Geranium oil	5 "
Bergamot oil	200 "
Infusion of musk-pods, No. 1	22 "
" civet, No. 1	25 "

Toilet Vinegar (Violet)

Alcohol, 95 per cent.	5 kilos.
Glacial acetic acid	500 grams
Acetic ether	80 "
Water	1500 "
Bergamot oil	50 "
Infusion of benzoin	50 "
Tincture of musk	50 "
Synthetic jasmine oil	5 "
Ionone	5 "

Toilet Vinegar (Rose)

Alcohol, 95 per cent.	5 kilos.
Glacial acetic acid	500 grams
Synthetic rose oil	5 "
Geraniol	25 "
Palmarosa oil	25 "
Acetic ether	10 "
Water	1500 "

SMELLING SALTS AND SIMILAR PREPARATIONS 317

Toilet Vinegar (Muguet)

Alcohol, 95 per cent.	5 kilos.
Glacial acetic acid	500 grams
Balsam of Peru	50 "
Linalol	50 "
Terpineol	25 "
Bergamot oil	50 "
Synthetic muguet	40 "
Vanillin	5 "
Linalyl acetate	12 "
Water	1500 "
Acetic ether	80 "

The balsam of Peru should be dissolved in the alcohol before the addition of the water.

Toilet Vinegar—Pine Needle

Alcohol, 95 per cent.	5 kilos.
Glacial acetic acid	500 grams
Bornyl acetate	50 "
Lavender oil	15 "
Bergamot oil	20 "
Acetic ether	80 "
Water	1500 "

Toilet Vinegar—Millefleurs

Alcohol, 95 per cent.	11.5 litres
Infusion of benzoin, No. 1	700 grams
.. musk-pods, No. 1	100 "
.. jasmine, No. 1	1 litre
.. ambrette seed, No. 1	3 kilos.
.. orris, No. 1	1 kilo.
Acetic ether	150 grams
Acetic acid	250 "
Clove oil	100 "
Lemon oil	80 "
Bergamot oil	200 "

Toilet Vinegar—"Sublime Porte"

Lavender ambrée	2 litres
Eau de Cologne, No. 24	2 "
Infusion of Pimento	360 grams
.. benzoin	360 "
.. tolu	360 "
.. ambrette seed	540 "
.. orris	480 "
.. Tonquin bean	160 "
Oil of cloves	20 "
.. geranium	20 "
Alcohol, 95 per cent.	3 litres
Rose-water	350 grams
Acetic ether	150 "

• Toilet Vinegar, No. 2

Alcohol, 95 per cent.	15 litres
Infusion of benzoin, No. 1	850 grams
" storax, No. 1	200 "
" tolu, No. 1	300 "
" sandalwood, No. 1	220 "
" vanilla, No. 1	150 "
(Glacial acetic acid	250 "
Acetic ether	150 "
Oil of orange	107 "
" lemon ..	37 "
" bergamot ..	100 "
" petitgrain ..	18 "
" citronella ..	9 "
" lavender ..	6 "
" rosemary ..	9 "
Infusion of civet, No. 1	9 "
" balsam of Peru, No. 1	15 "

Reduce to 65 per cent. alcoholic strength with distilled water.

• Cosmetic Vinegar

Alcohol, 95 per cent.	35 litres
Oil of bergamot	250 grams
" orange	80 "
" rosemary ..	75 "
" lavender ..	70 "
" petitgrain ..	20 "
" neroli ..	10 "
Infusion of cloves	200 "
" storax ..	300 "
" benzoin ..	300 "
" ambergris ..	600 "
Caramel	75 "
Acetic acid	1 litre
Acetic ether	250 grams

• Aromatic Vinegar

Alcohol, 95 per cent.	4 litres
Oil of bergamot	30 grams
" lemon	30 "
" orange ..	8 "
" rosemary ..	6 "
" lavender ..	2 "
" neroli ..	1 gram
Eau de mellee	500 c.c.

Allow to stand for twenty-four hours, then add :—

Balsam of Peru	60 grams
Infusion of storax (calamita)	60 "
" benzoin	60 "
White vinegar	2 litres
Acetic acid	90 grams

SMELLING SALTS AND SIMILAR PREPARATIONS 319

An Alternative Formula

Alcohol, 95 per cent.	15 l. 250 c.c.
Infusion of benzoin, No. 1	187 grams
" storax, No. 1	187 "
" tolu, No. 1	100 "
" cinnamon	125 "
" vanilla, No. 2	37 "
" orris, No. 1	1 litre
Glacial acetic acid	300 grams
Acetic ether	100 "
Oil of bergamot	63 "
" petitgrain	13 "
" citronella	8 "
" lavender	6 "
Infusion of coriander, No. 1	4 "
Geranium oil	3 "

Reduce to 55 per cent. alcoholic strength with distilled water.

Ordinary Aromatic Vinegar

Water.....	18 litres
Acetic acid	1 litre
Acetic ether	250 grams
Citronella oil	60 "
Rosemary oil	60 "
Caramel	150 "

Bath Vinegar

Alcohol, 95 per cent.	3500 c.c.
Water.....	1000 c.c.
Acetic ether	80 grams
Acetic acid	150 "
Infusion of balsam of Peru	80 "
Oil of bergamot	60 "
" lemon	50 "
" neroli (synthetic)	10 "
" orange	25 "
" geranium	10 "

Before being filtered, toilet vinegars should be allowed to stand for fifteen days with repeated shaking. Balsam of Peru should be dissolved in alcohol before water is added.

AMMONIACAL PERFUMES AND SMELLING SALTS

These products, which are known under all kinds of fancy names, consist of ordinary carbonate of ammonia, or of liquid ammonia mixed with various perfumed essences. The ammoniacal substance has a hygienic, or even a medicinal value, as is, of course, well recognised: the perfume merely plays the part of the sugar in a bitter medicine.

Such salts are packed in various types of glass bottles; frequently containing an absorbent material such as sponge

or spongy asbestos, or even red cotton-wool, for the purpose of absorbing the aromatised liquid ammonia. When solid ammonium carbonate is used there is no need for the absorbent material, and the bottle is filled with small pieces of the carbonate and perfumed to taste. Frequently the carbonate is diluted with sulphate of potassium. Carbonate of ammonia requires a little preliminary preparation. One kilogram of the crude material is broken into small fragments and placed in a closely sealed vessel, together with 500 grams of liquid ammonia of sp. gr. 0.880. The mixture is shaken from time to time, and at the end of a month the salt is dried and is ready for use. A typical preparation is as follows :—

Liquid ammonia	1 litre
Infusion of musk	1 gram
Lavender oil	5 grams
Bergamot oil	1 gram
Rose	0.1 „

This is added to the solid ammonia and packed in bottles.

Ammoniacal Perfume with Camphor

Liquid ammonia	750 grams
Alcohol, 95 per cent.	750 „
Camphor	75 „
Infusion of musk	75 „
Oil of lavender	20 „
„ bergamot	25 „
„ lemon	10 „
isoEugenol	5 „

Ammoniacal Perfume with Lavender

Liquid ammonia	450 grams
Mitcham lavender oil	50 „
Citral	1 gram

Ammoniacal Perfume with Rose

Liquid ammonia	500 grams
Alcohol, 95 per cent.	250 „
Mitcham lavender oil	15 „
Infusion of musk	5 „
isoEugenol	3 „
Bergamot oil	8 „
Synthetic otto of rose	0.5 gram

Ammoniacal Perfume with Pine Oil

Liquid ammonia	500 grams
Alcohol, 95 per cent.	250 „
Oil of <i>Pinus sylvestris</i>	10 „
„ fir	10 „
Bornyl acetate	0.5 gram
Bergamot oil	8 grams
Chloroform	2

SMELLING SALTS AND SIMILAR PREPARATIONS 321

Perfume for "English Salts" (Inexhaustible Salts)

Liquid ammonia	1 litre
Oil of mace	2 grams
„ clove	2 „
„ lavender	3 „
„ geranium	3 „

Preston Salts

To a mixture of 2 kilos. of carbonate of ammonia and 1 kilo. of carbonate of potash, add 100 to 200 grams of an alcoholic infusion of heliotrope.

Other Perfumes for Preston Salts

Oil of rose	1 gram
„ lavender	5 grams
Oil of rose	2 „
„ lavender	2 „
Oil of lemon	2 „
„ bergamot	2 „
Oil of neroli	5 „
„ lemon	5 „
Oil of lavender	8 „
„ cloves	4 „
Oil of bergamot	5 „
„ rosemary	8 „

"Smelling Salts"

Liquid ammonia	1 litre
Infusion of musk, No. 1	2 grams
Oil of cinnamon	0.2 gram
„ rose	0.2 „
„ bergamot	7 grams

Terebene Smelling Salts

Carb. nate of ammonia	1 kilo.
Liquid ammonia	150 grams
Terebene	200 „
Chloroform	20 „
Citronella oil	10 „
Patchouli oil	1 gram

Vinegar Salts

The bottles are filled with crushed sulphate of ammonia, and the following mixture is poured in :—

Glacial acetic acid	75 grams
Bergamot oil	3.5 „
Lemon oil	3 „

Headache Cones

Menthol	100 grams
Benzoic acid	10 "
Eucalyptol	3 "

The mixture is melted and poured into conical moulds. On cooling, the cones are fixed on wooden or glass bases.

An alternative product is obtained by melting together paraffin wax and camphor, and adding menthol as desired.

Vinegar or Ammonia Pencils

These pencils, with either an acetic acid or an ammonia carbonate base, are perfumed, and are intended to replace the ordinary smelling salts.

Phosphate of lime	1 kilo.
Gum acacia	100 grams
Water	100 "
Perfume to taste	50 "
Acetic acid	200 "
Glycerine	200 "

The gum is dissolved in the water, the glycerine and phosphate are added, and finally the perfume is dissolved in the acid; the last named may be replaced by carbonate of ammonia. The mixture is moulded into the desired shape.

CHAPTER XIII

INCENSE; FUMIGATORS, ETC.

Up to the present we have only dealt with aromatic substances and perfumed preparations of which the bouquet or aroma is transmitted to the olfactory sense without the intervention of heat. It is now necessary to deal shortly with preparations the odour of which is not developed without the assistance of heat, or, in some cases, actual combustion. Incense is a typical example. The raw materials which are the constituents of incense are, as a rule, solid substances, but a few liquid products will have to be dealt with.

Incense is composed, in the main, of gum-resins and balsams which give off aromatic vapours at a somewhat elevated temperature. With these principal raw materials are often associated a few essential oils of very powerful odour, and such substances as musk, etc. Two principal types of incense are found in commerce: (1) Those which give off their odour merely at an elevation of temperature; (2) those which must be actually burned to be efficacious.

The former category includes a certain number of liquid preparations, and some dry ones known as incense powders.

Fumigation Extracts

I

Alcohol, 95 per cent.	1 litre
Oil of petitgrain	20 grams
„ cloves	10 „
„ lavender	40 „
„ bergamot	40 „
Balsam of Peru	40 „
Infusion of musk	2 „

Allow the mixture to digest for a month, and filter. A few drops sprinkled on a hot shovel will perfume a room.

II

Alcohol, 95 per cent.	1 litre
Signaloe wood	40 grams
Storax	100 „
Infusion of ambergris	40 „
„ geranium	100 „
„ musk	10 „
„ vanillin	100 „

The solid bodies are digested in alcohol for a month, and then filtered, and the liquids are added to the clear solution. The mixture is allowed to stand for eight days and again filtered, and is then bottled off.

III

Alcohol, 95 per cent.	6 litres
Cardamoms	10 grams
Cinnamon bark	20 "
Powdered orris	20 "
Tonquin beans	60 "
Benzoin	40 "
Balsam of Peru	40 "
Cascarilla bark	10 "

Allow to infuse at 35° for about a week, then filter. After cooling add :—

Infusion of musk	2 grams
" ambergris	3 "
Oil of petitgrain	20 "

and after two or three weeks again filter.

IV

Alcohol, 95 per cent.	2 litres
Infusion of musk, No. 2	800 c.c.
" tolu	400 "
" balsam of Peru	400 "
" benzoin	400 "
" storax	400 "
Oil of lavender	80 "
" thyme	80 "
" cloves	80 "
" lemon	50 "
" cinnamon	30 "
Geraniol	20 "

V

Alcohol, 95 per cent.	2 litres
isoEugenol	30 grams
Oil of lemon	30 "
" bergamot	40 "
" lavender	8 "
Synthetic ambergris	10 "
" neroli oil	1.5 "
Infusion of balsam of Peru	100 "
" storax	150 "

An infinite number of these formulæ might be given, but the above examples will be sufficient to show the general character of such preparations, which can be modified to suit the taste of the consumer, and the price at which the product is sold.

Incense Vinegar

Alcohol, 95 per cent.	1 litre
Crushed orris root	200 grams
Benzoin	200 "
Cardamoms	60 "
Cascarilla bark	100 "
Gum frankincense	100 "
Storax	25 "

Allow to infuse for a fortnight at 35°, filter, and add :—

Tincture of civet	2 grams
" musk	2 "
Balsam of Peru	25 "
" tolu	25 "
Oil of lemon	50 "
" geranium	100 "
" neroli	10 "
Glacial acetic acid	25 "

Digest for eight days with frequent agitation, and filter.

Incense Grains

These products, like incense extracts, give off their odour when heated on a metallic plate. They are called grains because they should be finely powdered and passed through a sieve of definite mesh, so as to be perfectly regular in size. The various products composing incense grain are usually artificially coloured. Rose and poppy petals are brightened by means of dilute sulphuric acid; orris root is stained red with indigo carmine, or rendered yellow with turmeric, green with a mixture of indigo and turmeric or crimson with tincture of cochineal.

Resins are moistened with alcohol, and the whole is dried and perfumed with essential oils and then packed in well-corked vessels.

Incense Grains

Cardamoms	100 grams
Cloves	100 "
Storax	100 "
Benzoin	100 "
Cascarilla bark	100 "
Frankincense	100 "
Dried lavender flowers	150 "
" rose flowers	150 "
Orris root	200 "
Oil of geranium	25 "
" bergamot	25 "
Infusion of musk	2 "

The oils are dissolved in alcohol, and then incorporated with the mass with plentiful stirring.

• *An Alternative Formula* •

Rose leaves	600	grams
Poppy leaves	600	..
Cascarilla bark	200	..
Orris root	600	..
Benzoin	400	..
Storax	200	..
Oil of petitgrain	25	..
Heliotropin	•2	..
Artificial musk	1	gram

FUMIGATING PASTILLES

ORIENTAL PASTILLES: PASTILLES "DU SERAIL"

Pastilles offer the easiest and cheapest, and at the same time most hygienic, method of disinfecting the atmosphere of dwelling rooms, as well as those used for public meetings, schools, and convalescent homes. The ingredients, before being used, should be reduced to a very fine powder (waste powder from the siftings of incense grains can be used for this purpose), and mixed carefully with the aromatic essences, etc., and then agglomerated by means of a solution of gum tragacanth, so as to form a plastic, homogeneous mass which can be dried.

The paste so obtained is quickly spread on a stone slab and divided into pieces of about 10 mm. thick and 20 mm. high. These pieces are cut into pyramid shape, so that they can stand upright and be completely burned. They are made of various colours, red, black, yellow, green, or sometimes colourless. They are sometimes cut into their proper shape by a suitable cutting mould.

Well mix in a mortar :—

Light charcoal	400	grams
Saltpetre	50	..
Powdered benzoin	250	..
" cloves	80	..
" vetiver root	80	..
" cinnamon	40	..
Balsam of tolu	40	..
Elemi resin	40	..
Vanillin	40	..
Heliotropin	20	..
Oil of cedarwood	20	..
" sandalwood	10	..
" neroli, artificial	10	..

OR

Charcoal	200	..
Saltpetre	50	..
Benzoic acid	250	..

Musk ambrette	50 grams
Powdered oak moss	100 "
Benzyl-isoeugenol	50 "
Rose stearoptene ¹	50 "
Geraniol	20 "
Coumarin	50 "
Rosinol (proprietary perfume)	20 "
Orris, root powdered	160 "

OR

Charcoal	750 grams
Saltpetre	100 "
Powdered benzoin	60 "
Nerolin, crystals	40 "
Musk	25 "
Artificial violet resin	25 "

This mixture is very economical and also very aromatic. Amongst other substances which may be used are storax, yellow amber, shellac, labdanum, balsam of Peru, opopanax, myrrh, mastic, rose petals, sandalwood, cedar wood, pyrethrum root, eucalyptus wood, various spices, vanilla, Tonquin beans, cardamoms, cascarrilla, and various essential oils.

Black Pastilles "du Serail"

Wood charcoal	1 kilo.
Gum benzoin	1 "
Granular storax	500 grams
Liquid storax	150 "
Balsam of Peru	75 "
Yellow amber	15 "
Musk-pod	5 "
Purified nitre	200 "
Gum tragacanth	40 "

Alternative Formula

Wood charcoal	1 kilo.
Gum benzoin	250 grams
Incense	100 "
Granular storax	50 "
Mastic	50 "
Ton	20 "
Neroli oil	5 "
Artificial musk	1 gram
Purified nitre	75 grams
Gum tragacanth	30 "

Red Oriental Pastilles

Red sandal wood	1 kilo.
Gum benzoin	150 grams
Balsam of tolu	200 "
Sandal oil	30 "
Oil of cloves	25 "
Neroli oil	10 "
Purified nitre	100 "
Gum tragacanth	30 "

¹ This is rarely obtainable; paraffin wax will do instead.

White Incense Pastilles

Very fine wood sawdust	1 kilo.
Sublimed benzoic acid	500 grams
Balsam of Peru	20 "
Civet	1 gram
Musk-pods	5 grams
Oil of roses	1 gram

For blue, yellow, or green pastilles the sawdust is tinted, preferably with the pigments mentioned above.

Armenian Paper

Armenian papers form the link between the first and second series of incense; some need simply heating to obtain their effect, while others must be burnt. The essential difference in the preparation of the two kinds lies in making the first fireproof by dipping them in a warm solution of alum, while, on the other hand, the combustion of the second is facilitated by soaking them in a solution of nitre (potassium nitrate) and by only using paper that is free from paste. 1 in 4 solutions of alum and potassium nitrate are used.

Incombustible Armenian Paper

A thin but fairly stiff paper is taken and soaked until it is saturated in a boiling solution of alum; after partially drying it is dipped into the following aromatic preparation:—

Alcohol, 95 per cent	2 litres
Melissa oil	10 grams
Oil of lemon	4 "
Mace oil	2 "
Cinnamon oil	2 "
Oil of cloves	2 "
Liquid storax	60 "
Balsam of Peru	150 "
Gum benzoin	400 "
Artificial musk infusion	25 "

Allow it to soak for fifteen days and then filter.

The following method may be employed:—

A solution of 500 grams of sandarach in 1 litre 500 c.c. of alcohol is prepared. The paper, which has just been soaked in alum, is covered with this and then sprinkled with the following powder:—

Powdered cascarilla	150 grams
" olibanum	250 "
" mastic	250 "

The paper is dried and then covered on both sides with the following solution:—

Sandarach infusion	375 grams
Styrax infusion	375 "
Gum benzoin infusion	125 "
Balsam of Peru infusion	60 "
" tolu infusion	125 "
Bergamot oil	25 "
Lavender oil	8 "
Eugenol	8 "
Geraniol	8 "
Cassia oil	5 "
Oil of petitgrain	3 "
Tincture of artificial musk	20 "
" " civet	20 "

The dry paper gives up all its perfume to the air when it is placed on the hearth of a wood, coke, or gas fire; it blackens but will now burn.

Combustible Armenian Paper

Alcohol, 90 per cent.	1 litre
Incense	200 grams
Storax	200 "
Gum benzoin	100 "
Balsam of Peru	50 "
" tolu	50 "

Leave to dissolve for a month, shaking it freely. A saturated solution of 100 grams of potassium nitrate is then added; and the paper free from paste is passed quickly through the mixture. After leaving it to drain it is dried in the air and cut into sheets for sale.

Alternative Formula

Alcohol	1 litre
Gum benzoin	200 grams
Balsam of Peru	50 "
" tolu	50 "
Oil of bitter orange	10 "
Musk infusion	4 "

Perfumes for the Room

These products are used not only to perfume the air in rooms, but also to make it healthy. The double end is attained by the use of pine oil (*Pinus picea*, L.), which is particularly rich in ozone. Eau de Cologne is equally good from this point of view. For the sick room, one or more disinfectants are added to the perfume; here eucalyptus oil in conjunction with formalin or quinosol is of great service. An ordinary atomiser is used.

Fir Cone Perfume

Alcohol	5 litres
Pine oil (<i>Pinus picea</i>)	200 grams
Bornyl acetate	25 "
Juniper-berry oil	50 "
Water	1 litre

Violet Perfume

Ordinary Eau de Cologne	5 litres
Orris infusion	500 grams
Ionone	5 "
Synthetic ylang-ylang oil	2 "

Lilac Perfume

Ordinary Eau de Cologne	5 litres
Terpincol	150 grams
Synthetic muguet	10 "
Vanillon	8 "

Muguet Perfume

Ordinary Eau de Cologne	5 litres
Synthetic muguet	25 grams
Linalyl acetate	10 "

"Eau Fumante"

Alcohol, 95 per cent.	2 litres
2nd musk infusion ..	800 c.c.
Tolu infusion	400 "
Balm of Peru infusion ..	400 "
Gum benzoin infusion ..	400 "
Styrax infusion	500 "
Lavender oil	100 grams
Thyme oil	125 "
Oil of cloves ..	100 "
" lemon	50 "
Citral	10 "
Cassia oil	25 "
Geraniol	40 "

ANTISEPTIC PERFUMES FOR THE SICK ROOM

Eucalyptus Perfume

Solution of eucalyptus oil (1 in 10)	250 grams
Formaldehyde	250 "
Alcohol	1 l. 500 c.c.

Eucalyptus-quinosol Perfume

Solution of eucalyptus oil (1 in 10)	250 grams
Quinosol	150 "
Alcohol	1 litre
Water	200 grams

Quinosol Perfume

Alcohol	5 litres
Quinosol	25 grams
Bergamot oil	20 "
Pine oil (<i>Pinus picea</i>)	75 "
Linalol	5 "
Gum benzoin infusion	100 "
Distilled water	1 l. 500 c.c.

CHAPTER XIV

SACHET POWDERS

It now remains to consider articles of perfumery specially concerned with the household hygiene. The first articles for consideration are dry aromatic powders called sachet powders.

The use of a dry aromatic powder is, without doubt, the most economical method of communicating an agreeable smell to linen, clothing, gloves, and other toilet articles, and at the same time preserving them from the destructive action of certain insects, which are kept away from wardrobes, etc., by a delicate perfume.

In making these sachets only perfumes which do not alter with keeping are used. Rosewood, lavender flowers, cedar- and sandal-wood, orris root, vetiver root, Tonquin beans, in a fine powder, are most suitable for making these articles. Gum benzoin, tolu, styrax, cloves, cinnamon, and other similar products are equally suitable. To increase the perfume of sachet powders a number of artificial perfumes in crystal or powder form may be used; heliotropin, vanillin, coumarin, amorphous aubepine, vanillon, and even essential oils, but these last should be used with care, so as to avoid staining the linen.

The different flowers used in making sachet powders are dried and reduced to powder by a special machine. Violet, jasmine, mignonette, or tuberose cannot be used, as these flowers lose their scent completely when dried.

The residues of the extractions of musk and civet and in general all waste products of the manufacture of perfumes may equally be utilised.

Ordinary kinds of sachet powder are usually mixed with sawdust of a non-resinous wood—tale, magnesia, or flour.

Fine Heliotrope Sachet Powder

Vanilla in pods	250 grams
Pulverised rosewood	90 "
• • • orris	250 "
Dried orange-flowers	500 "
Rose leaves	150 "
Balsam of tolu	125 "
Ambrette seeds	125 "
St. Lucia wood	560 "
Storax in paste	285 "
Gum benzoin	185 "
Tonquin beans	125 "

Reduce these substances to a fine powder. Triturate them with the essences, if any are to be added. Place the powder between two pieces of wadding and put a pinch on each of the exterior sides, and lay the wadding inside a bag of silk or satin prepared for that purpose.

Alternative Formula

Orris root	1 kilo.
Tonquin beans	1 "
Rose petals	1 "
Gum benzoin	300 grams
Vanillin	30 "
Geranium oil	10 "
Heliotropin	90 "
Musk-pods	50 "

Reduce these substances to a fine powder, and proceed as above.

Fine Carnation Sachet Powder

Dried orange-flowers	625 grams
Rose leaves	500 "
Orris	375 "
Cassia flowers	47 "
Cloves	315 "
Coriander	147 "
Pimento	31 "
St. Lucia wood	62 "
Ambrette seeds	62 "

Proceed as above.

"Marrchale" Sachet Powder

Rose leaves	938 grams
St. Lucia wood	14 kilo. 125 c.c.
Sandal wood	750 grams
Ambrette seeds	750 "
Bergamot peel	1 kilo. 250 c.c.
Cedar wood	1 kilo. 250 c.c.
Orris	469 grams
Pimento	235 "
Sumbul	31 "
Dried orange-flowers	625 "
Gum benzoin	315 "
Celery seeds	62 "
Cloves	93 "
Coriander	137 "
Cinnamon oil	2 "
First musk infusion	2 "
Artificial musk	1 gram
Bergamot oil	62 grams
Oil of lemon	31 "
" sweet orange	31 "

Proceed as above.

SACHET POWDERS

333

Alternative Formula

Orris root	3 kilos.
Rose petals	1 kilo.
Musk pods	50 grams
Artificial musk	1 gram
" rose oil	10 grams
Vanillin	5 "
Coumarin	1 gram
Balsam of tolu-infusion	100 grams
Geranium oil	20 "
Neroli oil	5 "

Sachet Powder "Mousseline"

Rose leaves	650 grams
Cedar wood	125 "
Ambrette seeds	125 "
Pimento	125 "
Black pepper	62 "
Ginger	62 "
Nutmeg	62 "
Aniseed	8 "
Inside of musk-pods	8 "
Oxyla campana root	125 "
Musk-pods	90 "
Orris	250 "
Cloves	31 "
Cinnamon wood	31 "

Proceed as above.

Fine Cyprus Sachet Powder

Rosewood	3 kilos.
Ambrette seeds	1 kilo.
Sumbul	1 "
Pulverised orris	500 grams
Musk-pods	250 "
St. Lucia wood	1 kilo.
Cedar wood	2 kilos.
Palisander wood	2 "
Cinnamon oil	125 grams
Oil of cloves	60 "

Alternative Formula

Sandal wood	1 kilo.
Rose petals	1 "
Cedar wood	1 "
Lavender flowers	300 grams
Artificial musk	3 "
Rosewood oil	30 "
Artificial neroli oil	8 "

Ambrosia Sachet Powder

Ambrette seeds	250 grams
Rosewood	500 "
Sandal wood	250 "
Rose leaves	500 "
Pulverised orris	500 "
Gum benzoin	250 "
Artificial musk	5 "

Dried orange-flowers	500 grams
Oak moss	500 "
Palisander wood	250 "
Ebony wood	250 "

Proceed as above.

Musk Sachet Powder

Orris	1 kilo.
Ambrette seeds	1 "
Rose leaves	250 grams
Rosewood	250 "
Sandal wood	500 "
Balsam of tolu	500 "
Artificial musk	25 "
Civet	8 "

Patchouli Sachet Powder

Cedar wood	1 kilo.
Rosewood	250 "
Sandal wood	250 "
Patchouli leaves	500 "
Vetiver root	250 "
Florentine orris	250 "
Rose leaves	250 "
Artificial musk	1 gram
Coumarin	5 grams

Violet Sachet Powder

Orris root	2 kilo. 500 c.c.
Sandal wood	500 grams
Gum benzoin	150 "
Musk-pods	50 "
Ionone	25 "
Artificial oil of ylang-ylang	10 "
Concrete orris oil	10 "
Patchouli oil	10 "
Cedar oil	20 "

Rose Sachet Powder

Rose petals	1 kilo.
Rosewood	1 "
Orris root	1 "
Gum benzoin	300 grams
Artificial oil of roses	30 "
Geranium oil	10 "
Geraniol	1 gram
Musk-pods	40 grams
Coumarin	1 gram
Neroli oil	4 grams

"Millefleur" Sachet Powder

Coarsely ground orris	2 kilos.
Rose leaves	1 kilo.
Orange-flowers	1 "
Cassia flowers	1 "
Gum benzoin, No. 1	1 "
Artificial musk	15 grams
Heliotropin	30 "
Celery seeds	225 "
Benzyl acetate	5 "
Ionone	2 "

"Empress" Bouquet Sachet Powder

Violet powder	4 kilos.
Honey powder	4 " "
Chypre base	1 kilo, 200 c c.
Chypre powder	800 grams

Gum Benzoin Sachet Powder

Coarsely ground orris	2 kilos.
Powdered starch	1 kilo.
Ambrette	1 "
Musk base	1 "
Gum benzoin, No. 1	500 grams
Civet	2 "

Muguet Sachet Powder

Orris root	3 kilos.
Santal wood	500 grams
Gum benzoin	300 "
Musk pods	50 "
Artificial muguet	100 "
Artificial ylang-ylang	5 "
Linaloe oil	20 "

Spanish Skin Sachet Powder

Orris root	2 kilos.
Sandalwood	1 kilo.
Cedar wood	1 "
Lavender flowers	1 "
Gum benzoin	300 grams
Artificial neroli oil	30 "
Musk pods	100 "
Civet waste	50 "
Bergamot oil	50 "
Verveine oil	10 "
Artificial jasmine oil	20 "

Lavender Sachet Powder

Dried lavender flowers	2 kilos.
Orris root	1 kilo.
Sandalwood	500 grams
Musk waste	100 "
Gum benzoin	200 "
Lavender oil	100 "
Rosemary oil	20 "
Rose oil	5 "
Artificial bergamot oil	20 "

Sachet Powder—Trèfle Incarnat

Sandalwood	3 kilos.
Lavender flowers	1 kilo.
Rose petals	1 "
Oil of jasmine, artificial	20 grams
Artificial musk	1 gram
Tincture of benzoin	100 grams
Oil of ylang-ylang, artificial	50 "
Artificial orchid	80 "

Sachet Powder—Suitable for Export Trade

Powdered orris root	1 kilo.
Potato starch	2 kilos.
Sawdust	1 kilo.
Powdered sandalwood	400 grams
" vetivert root	100 "
" lavender flowers	100 "
Tincture of musk	100 "
Heliotropin	15 "
Oil of bergamot (artificial)	20 "
" Kuromoji	10 "
Infusion of balsam of Peru	100 "
Tincture of civet	50 "
Turanol (proprietary, floral odour)	5 "

Vetivert Bundles

Whilst dealing with sachet powders, we may mention a very simple but useful and hygienic preparation, from the household point of view, namely, small bundles of vetivert roots, freed from the earthy matter usually associated with them, and tied into suitable packets—in the form of a bundle, in which each root is tied with ribbon to the others at its lower end. The bundles weigh about 30 to 40 grams each. Vetivert is a powerful and penetrating perfume by itself, but can be modified as follows :—

Vetivert Extra

Vetivert root	1 kilo.
Orris root	200 grams
Musk	1 gram
Civet	2 grams

The mixture is allowed to stand for a month and the bundles are then packed as above.

Peau d'Espagne

This preparation is available for dry perfumes. Appreciated for its unique odour, it is used especially to perfume desks, writing-tables, and better class work-baskets and boxes, etc.

A piece of chamois leather or kid is soaked for at least eight days in the following aromatic liquid.

Alcohol, 95 per cent.	1 litre
Coumarin	2 grams
Oil of birch tar	0.5 gram
" bergamot	20 grams
" lemon	10 "
" sandalwood	20 "
Infusion of new-mown hay	20 "
" neroli	60 "

The leather is squeezed and dried, and is coated by means of a fine brush with the following solution :—

Alcoholic extract of musk	10 grams
" " civet	10 "
" " benzoin	50 "
Glycerine	20 "
Rose-water	50 "
Gum arabic	10 "

The leather is polished and mechanically stretched to its previous dimensions. It retains its perfume indefinitely and communicates it to objects with which it comes in contact.

An Alternative Formula

The leather may be soaked for three to four days in the following solution :—

Oil of rose (artificial)	40 grams
" neroli (artificial)	40 "
" sandalwood	40 "
Coumarin	2 "
Cinnamon oil	5 "
Infusion of benzoin	250 "
Bergamot oil	20 "
Lemon oil	20 "
Lavender oil	20 "
Artificial musk	10 "

It is then taken from the bath, drained, slowly air-dried on a glass plate, and then coated on the under surface by means of a brush with the following solution :—

Benzoic acid, natural	10 grams
Artificial musk	1 gram
Civet	1 "
Gum arabic	30 grams
Glycerine	20 "
Water	50 "

RUSSIAN LEATHER

In Russia, skins destined for the manufacture of gloves often undergo a special treatment with the view of removing the odour of the fish oil used in tanning them, and of giving them an agreeable, faint odour, which is known as that of "Russian leather." The perfume is derived from the oil extracted from birch tar by distillation. It is often adulterated with wood tar oil, when its empyreumatic odour has nothing in common with the genuine birch tar oil. The preparation of Russian leather is carried out at the tanneries, the skins being in contact

with a dilute solution of the oil. The exact details as used in Russia are kept secret. Attempts are made to imitate the true Russian leather by treating the skins in the same manner and with the same perfume as in the case of peau d'Espagne, but with this difference, that instead of using 0.5 gram of oil of birch tar, 2 grams are employed, and the 20 grams of infusion of new-mown hay are replaced by 2 to 5 grams of infusion of musk. Oil of birch tar, entirely freed from the tar itself, can be obtained in commerce.

Powder for Glove Perfumery

To perfume gloves, and to cover the disagreeable odour of fish oil used in their preparation, a mixture of powdered orris, magnesia, and talc is used, which is perfumed to taste.

Powdered orris root	500 grams
Magnesia	500 "
Talc	250 "

To give this powder a Russian leather odour, add a little of a mixture of 6 parts of rectified birch tar oil and 1 part of infusion of benjoin.

To give it a new-mown hay perfume, use the following mixture :-

Coumarin	100 grams
Turanol (proprietary, floral perfume)	10 "
Cratègine (proprietary, hawthorn odour)	10 "
Vanillin	10 "
Bergamot oil	15 "
Infusion of benzoin	25 "
Tincture of civet	25 "

To give it a heliotrope perfume use the following mixture :-

Heliotropin	90 grams
Vanillin	50 "
Infusion of civet	25 "
„ benzoin	25 "

These powders are enclosed in very fine tissue paper and placed inside the gloves to be perfumed.

Aromatic Perles

A modern substitute for perfumed skins and sachets of delicate odours may here be referred to. These aromatic perles are prepared of small volume and having a perfume which lasts practically indefinitely. They are prepared as follows :—

Ambergris	20 grams
Benzoin	100 ..
Powdered orris	60 ..
Crushed vanilla	10 ..
Cloves	10 ..
Cinnamon	10 ..
Oil of orange	60 ..
„ cedrat	10 ..
„ rose	10 ..

The ingredients are crushed and triturated with mucilage of tragacanth and glycerine, and so reduced to a homogeneous paste which is spread on a marble plate and dealt with in the same manner as pills are made in pharmacy. These pillules, coated with thin tin-foil, are placed in trinket-boxes, glove-boxes, hand-bags, purses, and similar receptacles, and communicate their perfume to them. Of course, the proportions of these various aromatic substances can be varied according to taste.

Perfumed Papers

The most simple method of perfuming paper consists in placing it for sufficient time in a sufficiently powerful sachet powder. Good results are obtained, but if the powder adheres to the paper, there is a certain amount of loss, and, further, small stains, due to the essential oils in the sachet powder, are to be expected on the paper.

Another method, adapted to the perfuming of visiting cards and other printed matter, consists in dipping them in an extract of the perfume. They are taken out in a few days, placed between blotting paper and strongly pressed. This dries them and stops them from losing their shape. It is obvious that glazed paper cannot be thus treated, as the alcohol will dissolve or spoil the glaze. Lithographic prints stand this treatment fairly well, but typographic impressions are liable to be spoiled.

There is a small machine, made by M. Savy, for rapidly perfuming cards and other printed matter.

The formulæ given below are useful for preparing any perfumed papers, including fumigating paper. Their base is always an infusion of resinous matter which forms a varnish and prevents the evaporation of the perfume. The infusion is best prepared by a mixture of the following resinous infusions: benzoin 20 per cent., balsam of tolu 20 per cent., storax 10 per cent., mastic 10 per cent., myrrh 10 per cent., frankincense 10 per cent., labdanum 10 per cent., shellac 10 per cent. These tinctures mix well, and to them are added infusions of musk, civet, Mousse

de chêne, ambrette, seeds, etc., as well as crystalline synthetics and essential oils.

The following formulæ are taken from *La Parfumerie moderne* (June 1913).

I

Infusion of frankincense	850 grams
„ benzoin	850 „
„ tolu	850 „
„ mastic	850 „
Musk ambrette	20 „
Methyl anthranilate	15 „
Benzyl isoeugenol	10 „
Commurin	10 „
Vanillin	10 „
Eglantile (proprietary, wild rose odour)	25 „
Mousse de chêne	5 „
Artificial mimosa	55 „

II

Infusion of opopanax	925 grams
„ lebdamm	925 „
„ storax	925 „
„ patchouli	925 „
„ civet	925 „
Rosindol (proprietary)	5 „
Artificial otto of rose	70 „

III

Infusion of shellac	900 grams
„ violindol (proprietary violet)	900 „
„ lavender flowers	900 „
„ orris	900 „
Ionone	50 „
Artificial jasmine	25 „
Violet resin	25 „

Another very simple process for perfuming cards consists in dipping them quickly into a perfumed bath made as follows :—

Artificial musk	10 grams
Commurin	70 „
Vanillin	70 „
Alcohol	to 1 litre

The alcohol is shaken with the crystals till saturated, and the perfume and alcohol are replenished in the same vessel from time to time. The clear liquid is decanted and serves as the base for other perfumes.

To perfume the paper or cards with given odours, the following additions to this base can be made :—

Violet	• = Ionone.
Clove-carnation	= <i>iso</i> Eugenol.
Trèfle incarnat	= Amyl salicylate.
Orchid	= Amyl salicylate and ylang-ylang.
Chypre	= Extract de chypre.
Muguet	= Terpineol and linalol.
Orange flower	= Synthetic neroli.
Jasmine •	= Benzyl acetate.
Hyacinth	= Phenyl acetic aldehyde.
Acacia	= Yara-yara.
Lilac	• = Terpineol.
Syringa	• = Terpineol and neroli oil.
Mousse de chêne	= Amyl salicylate and Mousse de chêne.

For pocket calendars, price lists, and other more or less voluminous papers printed on both sides, the machine alluded to above is used. Or a press may be employed, made air-tight with a lining of tinued iron, and having on either side a series of ledges to support threads stretched across the framework. These threads are covered with tissue paper. At the base of the press is a layer of strongly perfumed powder, and over this is laid the first sheet of tissue paper supporting the object to be perfumed. Above this is the next sheet of paper, containing more perfumed powder, and so on till the press is full. It is now closed and left under pressure for several days.

This method is, however, less efficacious than others that have been described. But it has the advantage of using up any waste perfumes from other operations, such as filter-papers which have been used for floral extracts and infusions, musk residues, etc. These residues can be placed in the press as above described. A good formula for a perfumed powder of this class is :—

Powdered orris root	5 kilos.
Musk residues	1 kilo.
Oil of ylang-ylang	10 grams
Bergamot oil	50 „
Artificial musk	2 „
Ionone	5 „
Infusion of benzoin	100

Powders which have been used for perfuming paper materials in this way can be used for cheap sachet powders.

Labels and wrappers for fine soaps, which should be perfumed, can be dealt with in this manner, or by moistening their under surface with the perfume, applied with a swab of linen. It is best to use for the wrapper the same perfume as that used for the soap, except that it is diluted three or four times with alcohol and should have added to it about 25 per cent. of its volume of infusion of benzoin or some other aromatic resin.

Or the perfume may be reinforced by a special ingredient in relation to the nature of the soap perfume.

The same perfume can also be used to perfume the boxes in which the soap is packed. The inside corners of the boxes are brushed with an alcoholic solution of the perfume for this purpose. The small amount of liquid applied by the brush soon penetrates into the pores of the cardboard. When the boxes are lined with coloured paper, the perfume often causes permanent stains. To avoid this, the perfume is mixed with powdered orris root and wrapped in small bags of tissue paper, and left in the boxes for several days. If the boxes are divided into compartments, as is usually the case with those used for high-class soaps, the divisions are removed and moistened on the bottom edges with the perfume.

It is wise to avoid false economy in the perfuming of paper and packages, because the purchaser always pays particular attention to the perfume of the unopened package. If the package smells attractive, the buyer associates the odour with the contents and purchases it. The cotton-wool used for packing should also be perfumed, as well as any other materials used in connection with the goods.

Perfumed paper is susceptible of various and novel applications. For example, electric light shades can be covered with such paper, which gives off an agreeable perfume when the lamp is lighted; the paper ornamentation of boxes to contain lingerie, gloves, lace, etc., can be perfumed, as well as paper destined to act as insecticides to preserve furs and feathers; artificial flowers can be manufactured of perfumed paper, as well as fancy post-cards, book-markers, etc.

Although much printed material is now perfumed, it is probable that there is room for expansion in this direction, in the perfuming of many things which appeal to the well-to-do classes.

Aromatic Tablets

The aromatic perles above referred to can be replaced with advantage by aromatic tablets of about half an inch in diameter. The manufacture of these requires a machine to granulate, and one to compress the powder into tablets. It is essential carefully to adjust the quantity of perfume to be used to the mass of the inert powder. The tablets should have a powerful and agreeable odour, which should be given off slowly so that they may last a considerable time. Consequently, the inert material should be

porous, a condition best realised by such substances as carbonate of magnesia. The following are suitable formulæ :—

I	
Rice-flour	2 kilos.
Magnesium carbonate	2 „
Powdered orris root	500 grams

II	
Chalk	2 kilos.
Magnesium carbonate	2 „
Powdered orris root	500 grams

III	
Magnesium carbonate	2 kilos.
Potato starch	10 „
Powdered orris root	1 kilo.

Such mixtures are granulated by means of the following, and the mass is then dried :—

Syrup	10 kilos.
Dextrin	900 grams
Water	10 kilos.
Salicylic or boric acid	30 grams

The addition of salicylic or boric acid is useful to prevent the paste from decomposing when it contains starchy matter. In the manufacture of the tablets the compression should only be moderate, so as to leave them somewhat porous.

The following are formulæ which may be employed. The quantities are calculated for about 4 to 5 kilos. of the mass, but this, of course, can be varied to suit special tastes.

<i>Violet</i>	
Bergamot oil	150 grams
Infusion of benzoin	150 „
Ylang-ylang oil (artificial)	40 „
Ionone	10 „
Violet leaf oil	5 „
Artificial musk	0.5 gram
Powdered orris root <i>ad lib.</i>	

<i>Heliotrope</i>	
Heliotropin	80 grams
Vanillin	30 „
Infusion of benzoin	150 „

<i>Lilac</i>	
Terpineol	150 grams
Oil of ylang-ylang (artificial)	10 „
Infusion of benzoin	50 „

<i>Trifle</i>	
Terpineol	100 grams
Oil of ylang-ylang (artificial)	50 „
„ Jasmine (artificial)	10 „
Infusion of benzoin	150 „
Amyl salicylate	40 „

<i>Mignonette</i>	
Oil of mignonette (artificial)	30 grams
„ bergamot	100 „
Infusion of benzoin	150 „
Geraniol	20 „
<i>Rose</i>	
Powder base	10 kilos.
Oil of rose (artificial)	30 grams
„ geranium	200 „
„ bois de rose	50 „
Tincture of musk	100 „
Infusion of benzoin	200 „
<i>Muguet</i>	
Powder base	10 kilos.
Linalol	100 grams
Geranylformate	10 „
Bergamot oil	30 „
Muguet (synthetic)	50 „
Vanillin	10 „
Infusion of benzoin	100 „
Tincture of musk	100 „
<i>Lily</i>	
Powder base	10 kilos.
Geranium oil	10 grams
Heliotropin	30 „
Vanillin	10 „
Tincture of musk	100 „
Infusion of balsam of Peru	100 „
Oil of neroli (synthetic)	10 „
<i>Patchouli</i>	
Oil of patchouli	30 grams
„ basil	10 „
„ verbenä	100 „
„ bergamot	50 „
„ cloves	10 „

These aromatic tablets offer an excellent means of popularising the use of perfumes among the poorer classes. They can be manufactured economically and sold cheaply, whilst yielding a good profit to the manufacturer. The absence of bottles, packing material, ribbon, etc., constitutes a considerable economy.

CHAPTER XV

TOILET SOAP AND VARIOUS PRODUCTS

THE scope of this work does not allow of entering into the details of soap manufacture, and we shall confine ourselves to giving a few formulæ for toilet soaps.

From the manufacturing point of view, toilet soaps may be divided into three categories, namely :

(1) Soaps made by hot saponification.

(2) Soaps made from a soap base, disintegrated, milled, and moulded in the cold.

(3) Soaps made by saponification at low temperatures.

It is the second category of toilet soaps that forms the most important class; they are the best possible, and, if a neutral soap base be used, are free from extraneous matter of a detergent nature, which exercises a corrosive action on the skin.

Those in class 3 are soaps made in the cold from coconut oil, and glycerine soaps made at a slightly elevated temperature.

SYNTHETIC PERFUMES IN SOAPS

The use of synthetic perfumes in toilet soaps, whether made by a hot or a cold process, does not, of course, give results entirely comparable with those obtained with natural perfumes and essential oils. It is only terpineol, carvenc, safrole, mirbane and a few others that are capable of resisting the effects of high temperatures and the action of alkalis. If soaps made by the hot process are perfumed with synthetic perfumes, they are frequently so spoilt in the process that little or no perfume is left, and the cost involved is entirely wasted. The high resisting power of terpineol has caused its use to spread, especially in conjunction with oils of citronella and cloves, and to some extent oil of mirbane.

Even for coconut oil soap made in the cold there are only a limited number of synthetic perfumes which can be used, for

many of them are spoiled by the heat developed in the reaction itself. Saffrole, carfene, artificial wintergreen oil and terpincol are to be recommended in this case.

This observation is equally applicable to glycerine soaps, where also artificial musk is used.

In principle, artificial perfumes should only be used for perfectly neutral soaps which are disintegrated, milled, and moulded in the cold, as the heat developed in these operations is not sufficient to spoil their perfume. It is then sufficient to mix them mechanically with the flaked mass in the same way as essential oils and other natural perfumes. As for solid crystalline perfumes, they are previously dissolved in the essential oils, as prescribed in the formulæ, or, in default of this, in a little alcohol which has been slightly warmed before using it, in very small quantities. In this way, the most complete distribution of the perfume throughout the soap is obtained; in any case, crystallised perfumes should not be added except in solution, for if added when solid, they eventually dissolve in the soap and produce stains that render the soap unsaleable.

In a great many cases natural civet and musk can be replaced in disintegrated soap by artificial civet with a mixture of natural and artificial musk. Artificial civet is generally used in alcoholic solution; but the direct addition of alcohol to the soap is inadvisable, as alcohol has undesirable effects on certain skins. The difficulty is overcome by dissolving the artificial musk in bergamot oil, finely crushing the artificial civet in a mortar with 12 grams of natural musk and 250-400 grams of powdered orris and powdered sugar, and adding the whole to the body of the soap. The use of alcohol is thus avoided.

The Permanency of Perfumes in Toilet Soaps

It often happens that toilet soaps made by disintegration of a soap base in the cold become altered both in colour and scent while in storage. Accidents of this kind are not infrequent; they are generally due to the inexperience of the manufacturer, and to his imperfect knowledge of the perfumes used and of their behaviour in composition. A series of experiments have been made on this subject with the object of studying the effect of different perfumes on the colour of soap, and also their stability in the soap during storage.

For this purpose, different perfumes, natural and synthetic,

TOILET SOAP AND VARIOUS PRODUCTS 347

were separately incorporated with a soap of white, neutral base and after keeping the soap for six months the results set out in the following table were obtained. The amount of perfumes used was such that the newly-made soap had a scent of normal intensity.

Description.	Scent.	Colour.
Amanthol	good	good
Ambrettol	very strong	"
Amyl acetate	weak	"
Anethole	excellent	"
Aspic	very weak	grey
Anlepine	very good	good
Badiane (oil)	good	"
Benzoic aldehyde	weak	"
Bergamot (oil)	good	"
Bitter almonds (oil)	weak	"
Bourbonal	good	brownish
Cananga (oil)	"	good
Carnation, 1	bad	grey
" 1b	weak	yellowish
Carvene	good	"
Caraway (oil)	weak	"
Cassia (oil)	"	"
Cedarwood (oil)	"	good
Ceylon cinnamon (oil)	"	yellowish
Citral	good	good
Citronella (oil)	"	yellowish, stains
Cloves (oil)	"	grey
Coriander (oil)	weak	good
Coumarin (oil)	good	yellowish
Dianthyl	"	good
Eucalyptus (oil)	"	"
Eugenol	"	yellowish
Penal	very good	good
Fennel (oil)	very weak	"
Geraniol	weak	"
Geranium, Bourbon (oil)	very good	yellowish
" palmarosa (oil)	good	good
Gingergrass (oil)	"	"
Heliotropin	very good	yellowish
Ionone	good	"
Irolene	very good	"
isoEugenol	good	good
isoSafrole	"	"
Jacinthin	very weak	yellowish
Jasmine (oil)	"	"
Kuromoji (oil)	good	good
Lavender (oil)	"	yellowish, slight stains
Lemon (oil)	"	good
Lemongrass (oil)	"	yellowish
Liualoe (oil)	"	good
Mace (oil)	"	"
Mimosæ	"	"
Mint seed (oil)	very good	"
Mirbane (oil)	good	yellowish

Description.	Scent.	Colour.
Musk, natural	very good	yellowish
„ artificial	very weak, but good	good
Muguet	good, but a little weak	„
Opopanax (oil)	„	„
Orgeol	fairly good	„
Orris liquid (oil)	very weak	„
„ solid	good	dark
„ (infusion)	entirely gone	good
Patchouli (oil)	good	„
Pern (balsam)	„	grey
Petitgrain (oil)	„	yellowish
Peppermint (oil)	good	good
Réuniol	very weak	yellowish
Rose, natural (oil)	good	good
„ artificial (oil)	„	„
Rosewood (oil)	„	„
Rosemary (oil)	„	„
Safrole	„	„
Santal (oil)	very good	„
Sassafras (oil)	good	„
Styrax	„	greyish
Sweet orange (oil)	very weak	yellowish
Terpineol	good	good
Terpinene	very weak	„
Thymol	good	„
Thyme (oil)	„	„
Trefoil (amyl ether of salicylic acid)	very good	„
Tolu (balsam)	„	brownish
Turanol	„	yellowish
Vanillin	„	brown
Verbena (oil)	good	yellowish
Wintergreen (oil)	very good	good
Ylang-ylang (oil)	weak	„
Ylang-ylang, artificial	„	„
Yara-yara	very strong	„
Civet, natural	good	„
Civet, artificial	a little dissipated	„

It follows from the above that certain perfumes have considerable influence on the colour of the soap which they are used with. But some perfumes, employed by themselves, give unsatisfactory results, whilst used in combination with other perfumes they may give quite astonishing results. An indication is obtained from the above table of the perfumes which can safely be used in perfuming white soaps. It will be seen that lavender, so often used, acts upon the colour when used by itself. It is but rarely that a single perfume gives all the results expected of it, hence the necessity of associating it with other perfumes which the knowledge of the perfumer enables him to select.

Perfume Bases for Toilet Soaps

In making up a perfume for toilet soaps, there are two points to consider. Shall it be made to represent the perfume of a given substance, a flower, for example? Or shall it be a fancy perfume—a bouquet, so to speak? In the former case, the basic perfume is obviously that of the flower itself, and subsidiary perfumes must be ones which are sharply defined and which will not materially alter the character of the main odour. In the latter case, the perfumer has a free choice of his own skill to create varying odours on any base he pleases.

For the finest and second-grade flower and similar perfumes, the odours to employ are those of the rose, violet, lily of the valley, carnation, heliotrope, lilac, patchouli, hyacinth, jasmine, new-mown hay, mignonette, sweet pea, sandalwood, trèfle, orange-flower, almond, spike, and ylang-ylang. But many of these perfumes are too expensive to be employed alone in soaps. As effective bases one can best employ the oils of spike, sandalwood, geranium, and patchouli. Other such perfumes can be obtained by means of mixtures. For the odours of heliotrope, lilac, jasmine, hyacinth, new-mown hay, sweet pea, trèfle, orange-flower, and almond, there exist an excellent series of synthetics.

The following table gives an indication of the best bases to employ for reproducing flower odours in soap.

Heliotrope	— Orris resinoid; heliotropin.
New-mown hay	— Coumarin and liquid storax.
Hyacinth	— Artificial hyacinth oil (bromostyrolene or phenyl acetic aldehyde as basis) and heliotropin.
Jasmine	— Benzyl acetate heliotropin.
Muguet	— Linalol, terpineol, artificial muguet.
Almonds	— Benzaldehyde.
Orange-flower	— Artificial neroli oil.
Patchouli	— Patchouli oil and resinoid.
Mignonette	— Orris resinoid, oil of basil.
Rose	— Otto of rose, geranium oil.
Sandalwood	— Santal resinoid, sandalwood oil.
Sweetpea	— Terpineol, anisic aldehyde.
Trèfle	— Amyl salicylate, heliotropin.
Violet	— Orris resinoid, oils of orris, ionone.
Ylang-ylang	— Orris resinoid, oil of ylang-ylang.
Carnation	— iso Eugenol, carnation, resinoid.

It is certain that the resinoids, as we call the residues of distillation of the resins and oils, etc., together, are of great value in soap perfumery. They contain some little essential oil and the resin eliminated by the organs of the plants distilled. They act both as perfumes and as fixatives at the same time.

The resinoids chiefly employed are those of orris, carnation, patchouli, sandalwood, vetivert and mousse de chêne. They are not always cheaper than the corresponding essential oil, but they are often of more value in the perfuming of soap. Artificial musk is another important base in soap perfumery. It cannot be employed alone, nor with other substances when one reproduces fine flower perfumes, since it destroys their delicacy. It is not, therefore, often employed in violet soaps, but it is used considerably in the production of fancy perfumes.

Balsams and gum resins are gradually falling into disuse in soap perfumery, synthetics taking their place.

In the manufacture of fancy odours, the resinoids are still of the highest importance, after which follow the various artificial perfumes such as coumarin, aubepine, heliotropin, etc., as well as many proprietary artificial perfumes, such as turanol, etc. Perfumes of the type of niobe and yara-yara are often employed in soaps exported to India and the Far East. Numerous essential oils are used to assist in the production of fancy odours, such as bergamot, lavender, cassia and, particularly, Bourbon geranium. This last named is most useful for rose and other delicate odours, and, in combination with various artificial perfumes furnishes very rich combinations. Oil of linaloe, which is the basis of muguet odours, has been discarded to a large extent in favour of synthetics. Sandalwood oil, on the contrary, is more than ever employed, and so is oil of cedar-wood. Both are highly appreciated bases.

Citronella oil, formerly much used, is now seldom employed (except in household soaps) in any but so-called honey soap; but even here a synthetic honey odour is preferred. Combined with other perfumes, the latter gives excellent results in milled soaps. But the best and strongest adjunct to citronella oil is terpinol, which is one of the most generally used synthetics for soap perfumery.

Musk soaps, for which there is always a good demand, are not perfumed with musk as their chief perfume, but with lavender or cassia to which is added artificial musk dissolved in the warm essential oils. The resulting musk odour, combined with these oils, is very powerful.

A perfume much used lately in soap making is benzyl acetate, on account of its jasmine odour. But it requires the aid of a good fixative, otherwise it is too fugitive and lacks stability. Methyl anthranilate is also much appreciated as a

basis for numerous compositions. It is especially useful in rose perfumes, but must be used with discretion and its odour not allowed to predominate.

For soaps with pine odours, borneol is the base, and should be mixed with bornyl acetate, and modified with lavender or other suitable odours, and fixed with storax or resinoids.

We should mention that the perfumes enumerated above are most suitable for milled soaps, and not those made by the hot process, nor for soaps made by the cold saponification of coconut oil.

The Employment of Synthetics for Perfuming Coconut Oil Soaps.

It follows from what we have said that there is a difference in the method of perfuming of cold process neutral milled soaps and soaps made in the ordinary manner from coconut oil. Although these are made at a temperature only slightly elevated, the soap paste becomes somewhat hot in the process, and, besides, the perfumes used come into direct contact with free alkali. Perfumes must therefore be chosen which will resist the combined effects of temperature and alkali. The following substances are suitable for perfuming this type of soap.

Anisic aldehyde, or aubepine, has a very agreeable odour. It is very stable in soap and is to be recommended. The contrary has been stated in reference to milled soaps, but it is probable that this was due to an unlucky combination of other elements of the perfume.

Benzoic aldehyde is especially suitable for perfuming good quality almond soaps. It should, however, be as free from chlorine as possible, as otherwise dark patches will develop in the soap.

Methyl benzoate (oil of niobe) is equally useful. Very small quantities are sufficient to produce good results. Its perfume is very stable and remains quite unchanged.

Bornyl acetate, which should be free from chlorine, ought not to be used alone, but in combination with a fixative, otherwise it evaporates too rapidly. Combined with geranium or clove oil, it gives good results.

Bornyl acetate is of powerful odour and is of considerable value in these soaps, and is very stable.

Citronellal is useful in honey soaps; with other types, it should be used in combination with other perfumes. It is not however, very stable towards alkalies.

Coumarin is of the greatest use. It is very stable and combines well with other perfumes.

Eugenol gives an excellent perfume and is very stable. Its only fault is that it tends to turn white soaps a little yellow. It assists other perfumes, such as geranium, etc.

Geranyl acetate is wonderfully useful in the production of rose odours; it is also used in lily of the valley perfumes.

Heliotropin is of excellent odour. It is, however, disappointing from several points of view. It gives a heliotrope perfume, but it is unstable towards heat and light. Further, it tends to darken white soaps.

isoBornyl acetate is useful in the same sense as bornyl acetate.

isoBornyl formate is advantageously employed in combination with other perfumes. By itself, its odour is not very permanent.

isoEugenol has a remarkable and persistent odour, but it gives a cream shade to white soaps. By itself, if employed in reasonable amount, it tends to cause the soap to lose its cohesion.

isoSafrole is of much use in coconut oil soaps, but safrole is preferable as being more permanent. However, its odour is agreeable, and it can be used in combination with other perfumes.

Ionone in small quantities, combined with terpineol, artificial musk, etc., is useful for violet perfumes in this type of soap.

Linalyl acetate is not usefully substituted for bergamot oil in this soap, as it is not sufficiently permanent.

Muguet gives excellent results with cold-milled soaps, but the perfume is largely destroyed in coconut oil soaps.

Artificial musk gives a perfume of excellent value. It is best dissolved in other perfumes, but care must be taken that solution is complete, otherwise brown patches will be found in the soap. Hence it is best to colour musk soaps brown.

Neroline (bromelia) is of considerable value. It accentuates many other perfumes, even when employed in very small quantities. Its use, however, is generally somewhat disappointing.

Neroli oil (artificial) is of excellent value and gives a good perfume.

Oeillet possesses an excellent perfume, and is very stable. Eugenol is preferred, however, when strength is of more importance than delicacy.

Orchidée (trèfle, based on amylealicylate) is to be recommended. Its perfume is fine and lasting. With oils of clove and geranium, it gives an excellent bouquet.

Safrole is an ideal perfume for cheap soaps. It is absolutely

stable, and sufficiently strong, and can be combined with numerous other perfumes without objection.

Amyl salicylate. (See *Orchidée*.) This can be combined with geranium oil, eugenol, coumarin, terpineol, and aubepine.

Methyl salicylate (artificial wintergreen oil) is not much used. Its odour is too fugitive. It is useful, however, when mixed with other perfumes.

Terpineol, being very cheap, is much used for perfuming cheap soaps. It is very useful in coconut oil soaps, and is a useful base for better class soap perfumery. It is highly recommended as a perfume.

Thymene is useful, like safrole, for ordinary soap perfumery. It is lasting and economically advantageous.

Vanillin is not to be recommended for these soaps. Its perfume is not very agreeable in soaps, and it has a tendency to stain the soap brown.

Yara-yara is intense in odour, but does not produce the effect in these soaps that would be expected. It should be employed with amyl salicylate combinations, together with a little oil of geranium and eugenol.

Cinnamic aldehyde, free from chlorine, is exceedingly useful in these soaps. Its perfume is strong, yet fine. It is, however, rarely employed by itself.

Ethyl cinnamate is most useful in rose perfumes for this soap.

It is obvious, therefore, that many synthetics can be usefully employed for perfuming coconut oil soaps. Many and varied perfumes can be obtained, of a character sufficient to popularise this type of soap.

The Addition of Vegetable Powders to Toilet Soaps

The addition of any vegetable powder to good quality toilet soaps should only be made in order to improve the quality from a "cosmetic" point of view. It should increase the softness of the soap when used, and should, if possible, neutralise the effect of any traces of free alkali present. Some of these vegetable powders contain albuminous matter which has a beneficial effect on the skin. To this extent vegetable powders may improve the value of soap. Sometimes about 15 per cent. of almond meal is added to toilet soap, and sometimes a little borax, and in superfatted soaps a little lanoline. The two last named are, of course, not of vegetable origin. In England it is not uncommon

to add oatmeal. Oatmeal soaps are much appreciated, and are held to have a softening and whitening action.

Powdered orris root is frequently employed, principally for its perfume, but also as a cosmetic on account of its useful action on the skin. For this purpose it should be in the finest powder, otherwise the soap will appear rough when being used. Powdered orris root which has been treated with alcohol for infusion still retains enough perfume to be usefully employed for this purpose. But there is a tendency to turn the soap, when milled with oil, of a greyish colour, so that soaps containing orris are usually coloured a pale brown. When it is directly mixed with coconut oil soap manufactured in the cold, it turns it a darkish tint at once and eventually brown or even blackish, and the soap retains this colour. So-called violet soaps containing powdered orris and powdered orange peel, are, for obvious reasons, always coloured brown, otherwise they will be covered with dark spots or patches.

About 5 per cent. of orris root is the maximum that should be employed. If more be used, the soap will get dry and brittle, for the added powder will always absorb the natural moisture of the soap. This must be borne in mind in the milling, and if it is seen that the soap is a little too dry for milling and moulding, some more fresh shavings of the soap base must be added, but no water should be added, or the soap will develop spots or patches which will make it unsaleable. Care should also be taken that the powder is uniformly distributed throughout the mass, and not allowed to form agglomerates.

Sometimes a little finely powdered sandalwood is added to soaps perfumed with the oil, in order to reinforce the perfume. It is the same with cedarwood oil soaps.

Finely powdered rose petals, or patchouli leaves, are occasionally employed, but their somewhat weak perfumes are advantageously replaced by synthetics. The following formula illustrate soaps containing added powders:—

Almond Meal Soap

White soap	85 kilos.
Powdered almond meal	15 "
Synthetic geranium oil	200 grams
" almond oil	100 "
Coumarin	20 "
Artificial musk	26 "

Colour a pale brown.

Oatmeal Soap

White soap	95 kilos.
Oatmeal	5 "
Powdered borax	1 kilo.
Terpineol	400 grams
Anbepine	140 "
Artificial musk	25 "
" neroli oil	40 "
Heliotropin	25 "
Oil of cloves	30 "

Colour a pale brown.

Sandalwood Soap

White soap	95 kilos.
Powdered sandalwood	5 "
Sandalwood oil	400 grams
Geranium oil (synthetic)	280 "
Commurin	10 "
Oil of neroli (synthetic)	40 "
" patchouli	25 "
Orris resinoid	60 "
Artificial musk	60 "

Colour brown.

Cedarwood Soap

White soap	95 kilos.
Powdered cedarwood	3 "
" orris root	2 "
Oil of cedarwood	300 grams
" geranium (synthetic)	300 "
Heliotropin	40 "
Artificial musk	85 "
Oil of guaiac-wood	100 "
Anbepine	35 "

Colour a pale brown.

The following formulæ for toilet soap are divided into two groups. The first comprises milled soaps made from a white soap base, and the second soaps made from coconut oil by cold saponification.

(1) *Milled Soaps, etc.*

Soap "Guinpaure"

White soap	25 kilos.
Oil of peppermint	40 grams
" thyme, white	62 "
" lavender	27 "

Rose Coloured Soap

White soap	25 kilos.
Oil of thyme, red	43 grams
" spike	43 "
" citronella	43 "
" lavender	30 "
" cinnamon	10 "
Vermilion colour	38 "
" Savon fluorine "	38 "

<i>Yellow Soap</i>	
White soap	25 kilos.
Oil of peppermint	100 grams
„ cloves	25 „
„ cinnamon	10 „
Yellow ochre	35 „
Palm soap	5 „

<i>“ Savon Chamois ”</i>	
White soap	25 kilos.
Oil of cloves	60 grams
„ peppermint	25 „
„ caraway	25 „
„ cinnamon	10 „
Vermilion colour	28 „
Alcoholic solution of yellow colour	23 „

<i>Windsor Soap (Cheap)</i>	
Soap	25 kilos.
¹ Oil of mirbane	200 grams
Oxide of iron	50 „
Caramel	120 „

“ SAVONS MIGNONS ”

These soaps are usually made into small tablets weighing about 2½ ounces. The following are formulæ for twelve different perfumes : —

Vanilla Soap

I	
White soap	25 kilos.
Infusion of coumarin, No. I	20 grams
„ balsam of Peru, No. I	20 „
„ vanillon, No. II	130 „
¹ Oil of mirbane	24 „
„ geranium, rose	30 „
Burnt amber	15 „
Alcoholic solution of yellow colour	12 „

Vanilla Soap

II	
Lard soap	25 kilos.
Powdered vanilla	200 grams
Balsam of Peru	120 „
Infusion of benzoin	130 „
„ orris	130 „
„ of musk	15 „
„ vanilla	120 „
„ civet	3 „
Oil of cloves	15 „
„ bergamot	10 „

¹ Preferably, benzaldehyde.

TOILET SOAP AND VARIOUS PRODUCTS 357

Violet Soap

Brown soap	30 kilos.
Powdered orris	175 grams
Oil of cloves	375 "
" bergamot	125 "

Benzoin Soap

Brown soap	30 kilos.
Balsam of Peru	280 grams
Oil of cloves	62 "
" sassafras	31 "
" bergamot	125 "

Musk Soap

White soap	25 kilos.
Infusion of orris, No. 2	65 grams
" storax, No. 1	40 "
" civet, No. 2	80 "
" musk-pods, No. 2	50 "
Oil of cinnamon	50 "
" cedar	50 "
" geranium	50 "
Yellow ochre	35 "
Vermilion	12 "

Patchouli Soap

White soap	25 kilos.
Infusion of benzoin, No. 2	35 grams
" storax, No. 1	35 "
Oil of patchouli	40 "
" sandalwood	35 "
" citronella	46 "
" cedar	50 "
" lemon	46 "
Solution of yellow dye	85 "
Vermilion	24 "

Almond-Flower Soap

White soap	25 kilos.
Oil of geranium	85 grams
" bergamot	45 "
" wintergreen	45 "
" mirbane	112 "
Vermilion	20 "

"Savon Bouquet"

White soap	25 kilos.
Infusion of civet No. 2	28 grams
Oil of petitgrain	20 "
" cinnamon	25 "
" cloves	47 "
" bergamot	77 "
" lemon	25 "
Burnt umber	26 "
Oxide of iron	12 "
Yellow ochre	8 "

¹ Preferably, benzaldehyde.

Verbena Soap

White soap	25 kilos.
Verbena oil	135 grams
Aniline green	80 "

Orris Soap

Brown soap	25 kilos.
Oil of bergamot	220 grams
.. geranium	18 "
.. cedrat	36 "
.. sandalwood oil	9 "
Infusion of civet, No. 2	70 "
Powdered orris	500 "
Emerald green dye	6 "

Jasmine Soap

White soap	25 kilos.
Oil of n'obe	20 grams
.. wintergreen	26 "
.. citronella	30 "
.. bergamot	64 "
.. geranium	70 "
.. ylang-ylang	12 "

"Lettuce Juice Soap"

White soap	25 kilos.
Oil of neroli	50 grams
.. petitgrain	35 "
Infusion of rose	25 "
Oil of bergamot	20 "
Infusion of musk	20 "
Chrome yellow	65 "

Opopanax Soap

White soap	25 kilos.
Oil of geranium	56 grams
.. petitgrain	10 "
.. bergamot	110 "
.. patchouli	10 "
.. orris	8 "
Infusion of musk, No. 2	20 "
Solution of yellow dye	80 "

White Lilac Soap

White soap	25 kilos.
Muguet	200 grams
Oil of lemon	6 "
.. bergamot	6 "
.. orange	8 "
Infusion of orris, No. 1	34 "
.. vanillin, No. 2	20 "
.. storax, No. 1	7 "

VARIOUS SOAPS

Ordinary Almond Soap

White soap	25 kilos.
¹ Oil of mirbane	75 grams
.. lavender	50 "

¹ This is for cheap soap; benzaldehyde should be used for fine odour.

TOILET SOAP AND VARIOUS PRODUCTS 359

Fine Rose Soap

Soap (animal fat)	25 kilos.
Otto of rose	46 grams
Oil of bergamot	20 "
„ cloves	40 "
Infusion of musk	50 "
„ civet	5 "

Amber Soap

Soap (animal fat)	25 kilos.
Otto of rose	25 grams
Oil of geranium	10 "
„ bergamot	40 "
„ cloves	15 "
Infusion of musk	25 "
„ civet	5 "

“ Savon Dulcifié ”

White soap	25 kilos.
Oil of bergamot	500 grams
„ thyme	300 "
„ almonds	100 "
„ lime	25 "
Chrome green	250 "

“ Lichen Soap ”

White soap	11.5 kilos.
Palm oil soap	1 kilo.
Caramel	15 grams
Vermilion	7 "
Annato	70 "
Oil of cinnamon	15 "
„ peppermint	20 "
„ lavender	40 "
„ cloves	12 "
„ caraway	6 "

Almond Soap (Fine)

White soap	25 kilos.
Oil of bitter almonds	260 grams

Almond Soap (Superfine)

White soap	25 kilos.
Oil of bitter almonds	280 grams

Lettuce Soap (Ordinary)

White soap	25 kilos.
Oil of caraway	162 grams
„ fennel	112 "
„ marjoram	58 "
Victoria green	40 "
Emerald green	10 "
Solution of yellow dye	20 "

Lettuce Soap (Medium Quality)

White soap	25 kilos.
Oil of geranium	130 grams
„ bergamot	130 „
„ petitgrain	20 „
„ sandalwood	14 „
Emerald green	8 „
Solution of yellow dye	8 „

Lettuce Soap (Fine)

White soap	25 kilos.
Oil of geranium	172 grams
„ bergamot	172 „
„ rose	8 „
„ petitgrain	72 „
„ sandalwood	46 „
Infusion of musk-pod, No. 1	54 „
Victoria green	20 „
Emerald green	6 „
Yellow dye	10 „

New-mown Hay Soap

	(Medium).	(Fine).
White soap	25 kilos.	25 kilos.
Oil of orange	23 grams	30 grams
„ verbena	4 „	11 „
„ lemon	22 „	29 „
„ lavender	24 „	41 „
„ petitgrain	4 „	11 „
„ rosemary	4 „	11 „
„ wintergreen	4 „	11 „
„ patchouli	4 „	11 „
„ geranium	6 „	13 „
„ bergamot	8 „	15 „
„ cloves	5 „	11 „
„ orris	18 „	25 „
Infusion of Tonquin beans, No. 1	10 „	17 „
„ vanillin, No. 2	10 „	—
Chrome green	30 „	15 „
Solution of yellow dye	56 „	28 „

Soap- Rose d'Orient

	(Medium).	(Fine).
White soap	25 kilos.	25 kilos.
Infusion of musk-pod, 1	—	72 grams
„ musk-pod, II	70 grams	—
„ civet, I	32 „	34 „
Oil of bergamot	13 „	15 „
„ geranium, rose	240 „	60 „
„ cloves	24 „	40 „
„ sandalwood	7 „	12 „
„ cinnamon	3 „	6 „
„ palmarosa	10 „	40 „
„ cananga	—	15 „
Pale red coloured soap	250 „	225 „

TOILET SOAP AND VARIOUS PRODUCTS 361

Savon Muguet (Fine)

White soap	25 kilos.
Oil of orris	6 grams
„ geranium	140 „
„ bergamot	140 „
„ palmarosa	10 „
„ ylang-ylang	30 „
Infusion of civet; No. 1	150 „

Patchouli Soap (Fine)

White soap	25 kilos.
Oil of cinnamon	30 grams
„ geranium	26 „
„ cedar	20 „
„ patchouli	250 „
„ citronella	15 „
Vermilion	5 „
Solution of yellow dye	25 „

Soap—Lavender-ambree

White soap	25 kilos.
French lavender oil	150 grams
Oil of bergamot	20 „
„ lemon	22 „
„ orange	25 „
„ neroli	6 „
„ orris	18 „
Infusion of storax, 1	25 „
„ vanilla, 1	25 „
„ benzoin, 1	35 „
„ musk-pod, 1	25 „
„ ambrette seeds, 1	48 „
Balsam of tolu	100 „
Solution of yellow dye	25 „
Vermilion	10 „

Verbena Soap (Fine)

White soap	25 kilos.
Infusion of benzoin, 1	10 grams
„ civet, 1	80 „
„ musk-pod, 1	80 „
Oil of citronella	25 „
„ lemon	45 „
„ bergamot	25 „
„ verberna	250 „
Victoria green	25 „

Opopanax Soap (Fine)

White soap	25 kilos.
Infusion of musk-pod, 1	30 grams
„ civet, 1	25 „
„ vanilla	50 „
„ opopanax, 1	50 „
Oil of geranium	60 „
„ neroli	12 „
„ bergamot	100 „
„ patchouli	16 „
„ orris	6 „
„ ylang-ylang	8 „
Solution of yellow dye	25 „

"Savon Mousseux"

White soap	25 kilos.
Infusion of benzoin, 1	250 grams
„ orris, 1	250 „
„ civet, 1	250 „
„ musk-pod, 1	150 „
Oil of bergamot	150 „
„ geranium	100 „
„ sandalwood	30 „
„ palmarosa	20 „
„ caraway	25 „
„ lavender	40 „
„ neroli	30 „
Burnt amber	6 „
Oxide of iron	7 „
Yellow ochre	5 „

Honeysuckle Soap

White soap	25 kilos.
Infusion of vanillin, 1	30 grams
„ coumarin, 1	50 „
„ vanilla, 1	300 „
Oil of bergamot	200 „
„ neroli	40 „
„ bitter almonds	50 „

Colour pale yellow.

Jockey Club Soap (Fine)

White soap	25 kilos.
Infusion of civet, 1	20 grams
„ musk, 1	20 „
„ orris, 1	90 „
„ Tonquin bean, 1	40 „
„ benzoin, 1	90 „
Oil of sandalwood	12 „
„ bergamot	55 „
„ cloves	25 „
„ cinnamon	9 „
„ neroli	8 „
Yellow dye	16 „

Soap—"Spring Breezes"

White soap	25 kilos.
Oil of geranium	200 grams
„ cinnamon	30 „
„ cloves	140 „
„ bergamot	200 „
„ lemon	50 „
Civet	6 „

Soap—"May Flowers"

White soap	25 kilos.
Infusion of benzoin, 1	70 grams
„ storax	43 „
Balsam of tolu	90 „
Oil of bergamot	35 „
„ cloves	45 „
„ geranium	55 „
„ rose	14 „
„ orange	22 „

Colour pale rose.

Musk Soap

	(Medium).	(Fine).
White soap	25 kilos.	25 kilos.
Infusion of vanilla	50 grams	—
Oil of cloves.....	10 „	—
„ geranium	10 „	40 grams
Infusion of civet, I	90 „	69 „
„ musk, I	10 „	—
„ musk-pods, I	150 „	375 „
Oil of sandalwood	—	26 „
Civet	—	10 „

Violet Soap

	(Cheap).	(Ordinary).
White soap	25 kilos.	25 kilos.
Oil of bergamot	480 grams	350 grams
„ geranium	28 „	30 „
„ cedrat	60 „	40 „
„ sandalwood	2 „	10 „
Infusion of musk-pod, II	72 „	800 „
Powdered orris	480 „	—
Emerald green	8 „	—
Oil of neroli	—	15 „
„ rose	—	10 „
Civet	—	10 „
Infusion of musk-pod, I	—	90 „
„ ambrette seeds	—	70 „

Soap—Bouquet (Cheap Ordinary)

White soap	25 kilos
Oil of bergamot	130 grams
„ lemon	26 „
„ cloves	70 „
„ cinnamon	18 „
„ neroli	8 „
„ geranium	50 „
Burnt amber	4 „
Iron oxide	5 „
Yellow ochre	1 gram

Soap—Almond Flowers (Cheap Ordinary)

White soap	25 kilos.
Oil of wintergreen	120 grams
„ geranium	200 „
„ bergamot	80 „
Infusion of musk-pod	20 „
Oil of mirbane	280 „
Vermilion	10 „

Verbena Soap (Cheap Ordinary)

White soap	25 kilos.
Oil of bergamot	6 grams
„ lemon	30 „
„ citronella	6 „
„ verbena	180 „
Infusion of civet, I	60 „
Victoria green	12 „

Soup—Lavender-ambree (Cheap Ordinary)

White soap	25 kilos.
Oil of lavender	400 grams
„ bergamot	40 „
„ spike	60 „
Infusion of musk-pod, II	20 „
„ civet, I	20 „
„ balsam of tolu, I	100 „
Solution of yellow dye	35 „
„ vermilion dye	15 „

Opoponax Soap (Cheap Ordinary)

White soap	25 kilos.
Oil of geranium	80 grams
„ neroli	8 „
„ bergamot	140 „
„ patchouli	30 „
„ orris	12 „
Infusion of musk-pod, I	30 „
Yellow dyo	75 „

Lilac Soap (Cheap Ordinary)

White soap	25 kilos.
Muguet	400 grams
Oil of lemon	20 „
„ bergamot	20 „
„ orange	20 „
„ orris	73 „
Infusion of vanillon, I	45 „
„ storax ¹	19 „

Rose Soap (Cheap Ordinary)

White soap	25 kilos.
Oil of geranium, rose	300 grams
„ bois de rose	20 „
„ bergamot	72 „
„ cloves	80 „
Infusion of musk-pod, No. I	72 „
Soap, yellow coloured	200 „

Heliotrope Soap (Cheap Ordinary)

White soap	25 kilos.
Infusion of vanilla, I	50 grams
„ Tonquin bean, I	100 „
„ benzoin, I	114 „
„ musk-pods, I	8 „
Balsam of Peru	30 „
Oil of geranium	10 „
„ bitter almonds	6 „
Infusion of storax, I	50 „

FURTHER SERIES OF MILLED SOAPS, PARTIALLY PERFUMED WITH SYNTHETICS

A.—BEST QUALITY SOAPS

Rose Soap

White soap	50 kilos.
Oil of rose (synthetic)	30 grams
„ bois de rose	120 „
„ bergamot	80 „
„ geranium	100 „
„ palmarosa	150 „
Infusion of musk	30 „
Tincture of civet (artificial)	250 „
Rhodamine	4 „
Ponceau	1 gram

Heliotrope Soap

White soap	30 kilos.
Artificial musk	1 gram
Heliotropin	50 grams
Vanillin	15 „
Oil of neroli (synthetic)	2 „
„ orris, liquid	15 „
„ almonds	2 „
Infusion of balsam of Peru	300 „

Heliotrope Soap "de Nice"

White soap	50 kilos.
Heliotropin	250 grams
Oil of neroli (artificial)	50 „
„ jasmine (artificial)	25 „
„ ylang-ylang	25 „
Zibethine	20 „
Vanillin	80 „
Oil of almonds	5 „
„ bergamot	120 „
Infusion of balsam of tolu	100 „
Coumarin	15 „
Orgeol	10 „

New-mown Hay Soap

White soap	30 kilos.
Artificial musk	2 grams
Coumarin	80 „
Nerolin	1 gram
Oil of peppermint	2 grams
„ bergamot	40 „
Infusion of benzoin	100 „
„ storax	50 „
Oil of lavender	30 „

"Savon à Violette de Nice"

White soap	45 kilos.
Palm oil soap	5 "
Powdered orris	2 grams
Artificial musk	5 "
Oil of bergamot	100 "
Infusion of benzoin	100 "
Ionone	20 "
Lavender oil	15 "
Oil of orris, liquid	50 "
Burnt amber	180 "
Cadmium yellow	20 "
Vermilion	10 "

"Opopanax Soap"

White soap	50 kilos.
Linalol	50 grams
Essence of opopanax	100 "
Aubepine	20 "
isoEugenol	50 "
Oil of vetiver	10 "
" wintergreen	20 "
Artificial musk	8 "
Tincture of civet, artificial	150 "
Oil of cedarwood	50 "

Colour brown.

"Indian Flower" Soap

White soap	40 kilos.
Palm oil soap	10 "
Oil of patchouli	100 grams
Geraniol	90 "
Oil of cedarwood	250 "
" vetiver	5 "
" bergamot	120 "
" cassia	35 "
Cinnamicin	25 "
Infusion of benzoin	100 "

Colour green.

"Ess. Bouquet" Soap

White soap	50 kilos.
Oil of bergamot	230 grams
" lavender	100 "
Geraniol	50 "
Eugenol	30 "
Oil of vetiver	5 "
Artificial musk	3 "
Aubepine	20 "
Linalol	40 "

Colour brown.

Soap—Trèfle Incarnat

White soap	50 kilos.
Orchidée	500 grams
Geraniol	100 "
Oil of bergamot	100 "
Minosa	40 "

TOILET SOAP AND VARIOUS PRODUCTS 367

Coumarin	50 grams
Eugenol	50 "
Oil of neroli (artificial)	30 "
Artificial civet	20 "

Colour pale rose.

Patchouli Soap

White soap	40 kilos.
Palm oil soap	10 "
Oil of patchouli	150 grams
.. vetivert	60 "
Artificial civet	10 "
Sandalwood oil	50 "

Colour green.

Millefleurs Soap

White soap	50 kilos.
Linalol	100 grams
Bergamot oil	100 "
Orris oil	40 "
Geranol	60 "
Oil of neroli (artificial)	20 "
.. sandalwood	40 "
.. wintergreen	30 "
Citral	20 "
Artificial musk	20 "
Coumarin	5 "
Tincture of civet (artificial)	50 "

"Savon Ivoire"

White soap	50 kilos.
Orgeol	20 grams
Artificial musk	5 "
Oil of bois de rose	100 "
.. sandalwood	20 "
.. bergamot	100 "
.. vetivert	5 "
Orris resinoid	20 "
Réniol	20 "
is. Eugenol	40 "
Cinnamoin	60 "

Colour rose.

Soap—Chinese Flowers

White soap	50 kilos.
Oil of vetivert	40 grams
.. cassia	20 "
Aubepine	10 "
Artificial musk	10 "
Yara-yara	2 "
Nerolin	2 "
Oil of petitgrain	40 "
Orgeol	20 "
Oil of bergamot	100 "
.. bitter orange	40 "

Colour brown.

Gardenia Soap

White soap	50 kilos.
Linalol	100 grams
Orchidée	40 "
Jacinthine	50 "
Oil of ylang-ylang	20 "
Heliotropin	20 "
Ionone	15 "
Coumarin	20 "
Oil of cananga	50 "
Infusion of musk	100 "
" storax	200 "
Aubepine	10 "
Fragarol	20 "
Bourbonal	30 "

Colour orange.

Jockey Club Soap

White soap	50 kilos.
Oil of neroli (synthetic)	100 grams
" bergamot	100 "
Terpineol	80 "
Artificial musk	15 "
Oil of petitgrain	75 "
Heliotropin	100 "
isoEugenol	20 "

Lavender Soap

White soap	50 kilos.
Oil of lavender	400 grams
" spike	150 "
" rosemary	85 "
Infusion of benzoin	100 "
Artificial musk	20 "

Colour pale green.

Eau de Cologne Soap

White soap	50 kilos.
Oil of bergamot	350 grams
" lemon	100 "
" neroli (artificial)	30 "
" lavender	10 "
Citral	20 "
Artificial musk	10 "
Oil of rosemary	10 "

Colour pale yellow.

"Savon Royal de Thridace"

White soap	50 kilos.
Oil of rose (artificial)	30 grams
Geraniol	50 "
Neroli oil	50 "
Petitgrain oil	100 "
isoEugenol	100 "
Orange oil	100 "
Bergamot oil	200 "
Lavender oil	100 "
Coriander oil	10 "
Anethole	10 "
Cinnamcin	50 "
Infusion of benzoin	200 "

TOILET SOAP AND VARIOUS PRODUCTS 361

Parma Violet Soap

White soap	50 kilos.
Ionone	60 grams
Oil of orris liquid	30 "
„ bergamot	250 "
Geraniol	50 "
Oil of neroli (artificial) ..	10 "
„ ylang-ylang (artificial) ..	30 "
„ linaloe	100 "
Infusion of benzoin	50 "
Artificial musk	5 "

Colour brown.

Savon au Muguet

White soap	50 kilos.
Oil of jasmine (artificial) ..	30 grams
Linalol	100 "
Muguet	400 "
Oil of bergamot	100 "
„ eugenol	20 "
„ orris (concrete)	20 "
„ almonds	20 "
Coumarin	30 "
Oil of ylang-ylang	20 "
Infusion of benzoin	100 "
Artificial musk	5 "

Jasmine Soap

White soap	50 kilos.
Benzyl acetate	120 grams
Bourbonal	30 "
Oil of linaloe	50 "
Artificial musk	20 "
Infusion of benzoin	100 "
Oil of cananga	15 "
„ rose (artificial)	5 "

Colour pale rose.

"Savon Rosiris"

White soap	50 kilos.
Oil of bergamot (artificial) ..	100 grams
Powdered orris	5 "
Réniol	35 "
Oil of geranium, Bourbon	80 "
„ orris, concrete	20 "
„ Eugenol	20 "
Oil of neroli (artificial)	15 "
„ patchouli	5 "

Colour pale red.

Musk Soaps

In perfuming musk soaps, natural musk, artificial musk, and seeds with a musk-like odour are employed. When only natural musk is employed, the soap is, of course, expensive. But artificial musk by itself is not sufficient for soap perfumery. It is necessary, to produce the proper perfume, to employ more

artificial musk than is soluble in the soap itself, and so yellow and brown stains in the soap result.

It is on this account that it is necessary to use natural musk, or artificial musk in the form of a tincture or infusion, or dissolved in the essential oils used in the perfume, or to triturate the artificial musk with the powdered orris or ambrette seeds, etc., used in the perfume and mill it with the soap base. Or, of course, the artificial musk may be dissolved in the solvents, such as benzyl benzoate, mentioned previously. Musk soaps are usually coloured pale brown, yellow or orange. Good musk soap can be made with cold process coconut oil soap. A little Japan wax is often added, the soap so prepared retaining the perfume better and more closely resembling soaps prepared from solid fats. Musk soaps should be kept in stock for four weeks before being sold, to allow the perfume to develop properly, when it is more intense and more stable. The manufacturer should not base his perfume by comparison of old samples, because the musk odour is always stronger in old than in new samples. The following are suitable formulae:—

	<i>Musk Soap</i>		
	<i>Ordinary.</i>	<i>Fine.</i>	<i>Superfine.</i>
White soap	25 kilos.	50 kilos.	50 kilos.
Palm oil soap	25 "	—	—
Powdered orris	1 kilo	—	—
.. ambrette seeds	1 "	—	—
Oil of cloves	120 grams	—	—
.. cedarwood	180 "	—	—
Musk (natural)	10 "	—	150 grams
Infusion of musk	—	400 kilos.	—
Artificial civet	—	30 "	—
.. musk	—	5 "	—
Bergamot oil	—	100 "	550 grams
Cassia oil	—	40 "	—
Infusion of benzoin	—	—	200 grams

They should be coloured brown; the natural musk is triturated with the orris and then milled with the soap; the artificial musk is dissolved in the essential oils.

<i>"Mousse de Chêne" Soap (Good Quality)</i>	
White soap	50 kilos.
Concrete essence of mousse de chêne	25 grams
Coumarin	20 "
Heliotropin	20 "
Lavender oil	100 "
Bergamot oil	40 "
Artificial musk	5 "
Aubepine	100 "
Terpineol	80 "

TOILET SOAP AND VARIOUS PRODUCTS 371

Colour dark green. The solid perfumes should be dissolved in the liquids, the concrete warmed and added to the solution the whole kept warm by immersing the container in warm water. As the perfume has a dark colour, it is necessary to colour the soap a shade between pale green and leaf green. This is an expensive soap, as the mousse de chène is somewhat costly. For cheap varieties, trèfle and coumarin are added, and most of the mousse de chène is omitted.

Soap—"Rose Muscade"

White soap	50 kilos.
Palmarol (proprietary).....	20 grams
Oil of geranium	100 "
.. rose	30 "
.. bois de rose.....	120 "
.. bergamot.....	80 "
Infusion of musk	30 "
Tincture of civet	250 "

B.—MEDIUM QUALITY SOAPS

Acacia Soap

White soap	50 kilos.
Oil of geranium, Algerian	50 grams
.. orris	10 "
.. neroli	10 "
.. petitgrain	20 "
Tincture of civet (artificial)	20 "
.. musk	30 "
Coumarin	15 "

Colour rose.

Orange Flower Soap

White soap	50 kilos.
Irolene (proprietary)	75 grams
Oil of petitgrain	30 "
Ananthol (proprietary)	5 "
Oil of geranium	50 "
Vanillin	5 "
Cadmium orange	50 "
Vermilion	20 "

Rose Soap

White soap	50 kilos.
isoEuganol	40 grams
Orgeol (proprietary)	20 "
Oil of cassia	40 "
.. lavender	50 "
.. geranium	100 "
.. palmarosa	50 "
Rhodamine	8 "
Ponceau	3 "

Honey Soap

White soap	25 kilos.
Palm oil soap	25 "
Oil of lavender	200 grams
" verbena	60 "
Citronellol	50 "
Oil of cassia	50 "
Artificial wax odour	30 "

Violet Soap

White soap	25 kilos.
Palm oil soap	25 "
Powdered orris	20 grams
Oil of bergamot	50 "
Irisone	65 "
Terpineol	200 "
Artificial musk	15 "
Oil of orris, liquid	50 "
" cananga	30 "

Colour pale brown.

Patchouli Soap

White soap	40 kilos.
Palm oil soap	10 "
Oil of patchouli	65 grams
" cedarwood	100 "
" wintergreen (artificial)	100 "
" cassia	80 "
Geraniol	20 "

Windsor Soap

White soap	25 kilos.
Palm oil soap	25 "
Oil of cassia	150 grams
" cloves	150 "
" lavender	100 "
Artificial musk	5 "

Lettuce Soap

White soap	40 kilos.
Palm oil soap	10 "
Oil of bergamot	200 grams
Artificial broom essence	20 "
" neroli oil	10 "
Geraniol	20 "
Oil of almonds	5 "

Colour green.

Lanoline Soap

White soap	50 kilos.
Lanoline	5 "
Oil of lavender	150 grams
" palmarosa	50 "
Eugenol	20 "
Bergamot oil	20 "

TOILET SOAP AND VARIOUS PRODUCTS 373

Petroleum Jelly Soap

White soap	50 kilos.
White petroleum jelly	5 "
Oil of geranium	60 grams
„ sandalwood	15 "
„ bergamot	60 "
Eugenol	20 "

Soap—Muguet

White soap	50 kilos.
Linalol	100 grams
Oil of cananga	100 "
Muguet	80 "
Jasmine oil (synthetic)	10 "

Heliotrope Soap

White soap	50 kilos.
Heliotropin	150 grams
Bourbonal	30 "
Bergamot oil	80 "
Geranium oil	30 "

Colour pale yellow.

Soap—Eglantine

White soap ..	50 kilos.
Geraniol	100 grams
Oil of bergamot ..	60 "
„ cloves ..	20 "
„ cassia ..	10 "
„ almonds ..	5 "
Tincture of civet (artificial) ..	50 "
„ „ musk ..	100 "
Rhodamine ..	3 "
Ponceau ..	1 gram

Ylang-ylang Soap

White soap	50 kilos.
Jasmine oil (synthetic)	10 grams
Vanillin	3 "
Tincture of musk (artificial) ..	30 "
Oil of cananga	30 "
„ linaloe	40 "
„ geranium	50 "
„ ylang-ylang	20 "
Nerolin ..	2 "

Colour pale yellow.

Opopanax Soap

White soap	50 kilos.
Oil of Opopanax	30 grams
„ rose (artificial)	5 "
„ palmarosa	20 "
„ patchouli	2 "
„ bergamot	80 "
„ neroli	5 "
„ sandalwood	3 "
Tincture of musk (artificial) ..	50 "

White soap	40 kilos.
Yellow soap	10 "
Storax	40 grams
Eugenol	40 "
Cedarwood oil	30 "
Safrol	30 "
Lavender oil	30 "
Coumarin	10 "
Bourbonal	35 "
Geraniol	25 "
Palmarosa oil	30 "
Heliotropin	15 "

Colour brown.

C.—SOAPS OF COMMON QUALITY

The soaps in this category are manufactured in the same manner as those in the previous ones, except that the quality of the base is not so good and the colour is brownish, and it is not always quite free from odour. This has to be taken into account in choosing the perfumes to be employed. The soap employed may be taken in each case as of second quality.

<i>Honey Soap</i>	
Soap	30 kilos.
Oil of citronella	90 grams
„ cassia	80 "
„ lavender	80 "

Colour orange.

<i>Patchouli Soap</i>	
Soap	30 kilos.
Oil of patchouli	20 grams
„ cassia	30 "
„ bergamot (artificial)	30 "

Colour green.

<i>Violet Soap</i>	
Soap	25 kilos.
Palm oil soap	5 "
Oil of bergamot (artificial)	80 grams
„ lavender	25 "
Terpineol	50 "
Artificial violet (ionone type)	20 "

Colour brown.

<i>Musk Soap</i>	
Soap	30 kilos.
Eugenol	40 grams
Oil of wintergreen	15 "
„ patchouli	10 "
Tincture of civet (artificial)	80 "
Benzoin	50 "
Artificial musk	5 "

Colour brown.

Windsor Soap

Soap	50 kilos.
Tincture of musk (artificial)	100 grams
Oil of cloves	60 "
„ cassia	100 "
„ lavender	40 "

Colour brown.

Rose Soap

Soap	40 kilos.
Coconut oil soap cuttings	10 "
Oil of gingergrass	80 grams
Geraniol	30 "
Eugenol	20 "
Palmarosa oil	50 "

Colour pink.

Jockey Club Soap

Soap	40 kilos.
Coconut oil soap cuttings	10 "
Oil of lavender	100 grams
„ cassia	40 "
Eugenol	30 "
Linalol	50 "
Amyl acetate	10 "

Colour wax yellow.

Mignonette Soap

Soap	40 kilos.
Coconut oil soap cuttings	10 "
Eugenol	40 grams
Sandalwood oil	40 "
Aniseed	15 "
Oil of geranium	30 "
„ wintergreen (artificial)	20 "
Citral	10 "

Buttermilk Soap

Buttermilk soap is obtained in the following manner. Whey is evaporated to one-fifth its volume in a vacuum pan at low temperature, so as to avoid burning and discoloration. To prepare the soap base, 43 kilos. of suet and 27 kilos. of coconut oil are melted together, and the fat is filtered. This is then heated to 80° preferably in a jacketed pan, and 35.5 kilos. of soda lye and 1 kilo. of potash lye of specific gravity 38° Bé. are added slowly with constant stirring until the mass becomes thick. The boiler is then left covered until the paste becomes vitreous. It is then allowed to cool to 60° and the evaporated whey is incorporated. Up to 50 per cent. can be added, but soaps containing 25 per cent. are easier to mill and mould. When the milk is well incorporated it is poured out into batches of 25-30 kilos. and allowed to cool. If the batches are kept too large

there is a tendency for the soap to turn brown. By the next day the soap can be shredded and dried for milling.

Perfume for Buttermilk Soap

Buttermilk soap	50 kilos.
Oil of geranium	100 grams
Geraniol	30 ..
Oil of rose (artificial)	10 ..
Eugenol	20 ..
Sandalwood oil	10 ..
Artificial musk	5 ..
Rhodamine	3 ..
Ponceau	1 gram

The soap can also be left uncoloured, or coloured wax yellow.

CASEIN SOAP

Casein is an albuminoid material widely distributed throughout the vegetable kingdom. The casein of commerce is extracted from cow's milk. On the industrial scale, it is obtained by defatting the milk and acidifying with acetic acid, when the casein is precipitated in a flocculent form. This precipitate is washed with water until it is free from acid, and then dried. When pure, casein is a pale yellowish powder. The total freedom from any tendency to become rancid, whilst possessing all the advantages of buttermilk, suggested the manufacture of casein soap. Casein toilet soaps appear to keep perfectly well, and the perfume is, possibly, improved in the sense that the casein may act as a fixative. They give a good lather, are soft to the touch and, possibly, have a good effect on the skin.

As casein is insoluble in water, it is necessary to render it soluble by combining it with alkalis, such as borax, caustic soda, bicarbonate of soda or ammonia. Whilst giving formulæ for casein soaps, we must call attention to the fact that the amount of alkali necessary to dissolve the casein varies to some extent with its quality. It is best to carry out an experiment on a small scale to decide what amount is actually necessary. For example:—

(1)		(2)		(3)	
Casein	8 kg. 520 gr.	Casein	" kg.	Casein	3 kg.
Water	28.4 litres	Water	10 litres	Water	18 litres
Borax	570 gr.	Bicarbonate		Caustic soda	
		of soda	200 gr.	added	100 gr.

The alkali is dissolved in the water and the casein added gradually with constant stirring, until a homogeneous mixture is obtained. It should be quite neutral so as to have practically no action on phenolphthalein, whilst all the casein should be dissolved. Or one can operate as follows: 10 kilos. of casein are mixed with the alkali and 15 litres of cold water and the mixture left for several hours. Then 25 litres of boiling water, in which 1 kilo. of borax has been dissolved, are added, with constant stirring. Then half to one kilo. of ammonia (sp. gr. 0.910) is slowly added, the mixture shaken, and allowed to cool. About 10 per cent. of this solution is incorporated with the shredded soap in the mixer. This will not render the soap too moist to work, and the mixture can in proper machines be passed straight on to the drier. The water of the casein solution evaporates with the natural water of the soap. Sometimes it is necessary, when one adds the casein solution to the soap in the mill, to have the soap a little drier than usual, as too much water may at times be a disadvantage, but no difficulties are met with in the mixing. Casein also has the advantage, if added in a small quantity unneutralised itself, of neutralising traces of free alkali contained in soap. If the casein has been neutralised with ammonia it will still effect this purpose, since the free caustic alkali of the soap will decompose the ammonium compound, the liberated ammonia being driven off by heat developed during the milling. For fine toilet soaps, solutions of casein are prepared which contain about 10 per cent. of glycerine, which improves the soap and allows it to be more easily worked.

Coconut Soap

The following is the formula for the base:—

Coconut oil	30 kilos.
Castor oil	3 „
38° Bé. caustic soda lye	16 kilos. 500 c.c.

It is perfumed according to the following formula, in which the quantities correspond with those in the base formula given above:—

<i>Fine Herb Soap</i>	
Cassia oil	35 grams
Thyme oil	40 „
Anethole	20 „
Lavender oil	35 „
Fennel oil	20 „
Lemongrass oil	10 „
Coriander oil	15 „
Colour: ultramarine-green (crushed with oil)	80 „

Honey Soap

Citronellol	100 grams
Fennel oil	30 "
Lavender oil	30 "
Spike oil	10 "
Thyme oil	20 "
Oil of cloves	20 "
Colour: orange	30 "

Lily Soap

Bergamot oil	50 grams
Geranium oil	25 "
Lavender oil	15 "
Sandalwood oil	5 "
Vanillin	5 "
Artificial musk	2 "
Oil of bitter almonds	2 "

Muguet Soap

Linaloe oil	200 grams
Orris oil	10 "
Synthetic neroli oil	10 "
Sandalwood oil	15 "
Anethole	15 "
Oil of cloves	95 "

Peach Flower Soap

Eugenol	50 grams
Lavender oil	70 "
Thyme oil	75 "
Cassia oil	25 "
Bergamot oil	25 "

Patchouli Soap

Patchouli oil	150 grams
Cedarwood oil	20 "
Tincture of artificial civet	30 "

PERFUMES FOR ALMOND SOAPS

The following quantities of perfume are suitable for 50 kilos of soap:—

I	
Natural oil of bitter almonds	50 grams
Artificial oil of bitter almonds	80 "
Carvene	25 "
Eugenol	10 "
II	
Artificial oil of bitter almonds	150 grams
Eugenol	10 "
III	
Artificial oil of bitter almonds	180 grams
IV	
Mirbane oil	200 grams

The synthetic perfumes used with coconut soaps made by saponification at a low temperature are safrole, carvene, and artificial oil of wintergreen; most of the other synthetics (except those mentioned above) are attacked by the heat emitted by these soaps in their manufacture.

The same perfumes are used with glycerine soaps, with which a little artificial musk may also be used.

For coconut soaps, the manufacture can be simplified by using for all colours a single mixture of perfumes in the proportion of 200 to 250 grams to 50 kilos. of soap. The following mixture is most suitable for this purpose:—

Lavender oil	400	grams
Rosemary oil	100	"
Oil of cloves	200	"
Eugenol	20	"
Cassia oil	200	"
Palmarosa oil	200	"

For soaps made in this way at medium temperatures the following are suitable formulæ:—

I		
Coconut or palm oil	100	kilos.
37° Bé. caustic soda lye	55	"
16° Bé. potassium carbonate lye	120	"
15° Bé. solution of salt	120	"

II		
Coconut or palm oil	50	kilos.
Tallow	50	"
37° Bé. caustic soda lye	60	"
16° Bé. potassium carbonate lye	120	"
15° Bé. solution of salt	60	"
Waterglass	30	"

III		
Coconut or palm oil	70	kilos.
Cotton oil	30	"
37° Bé. caustic soda lye	60	"
16° Bé. potassium carbonate lye	120	"
15° Bé. calcium chloride solution	20	"
15° Bé. solution of salt	80	"
Waterglass	25	"

Superfatted Coconut in Lanoline Soap

Cochin cocoa-nut oil	114	kilos.
37° Bé. caustic soda lye	58	"
37° Bé. caustic potash lye	3	kilo. 500 c.c.
Water	1	" 500 "
Lanoline	15	kilos.
Artificial musk	5	grams
Lavender oil	100	"
Bergamot	30	"
Cedarwood oil	30	"
Dianthin N and C	15	"

Disintegrated soaps can be superfatted in the same way with lanoline or with petroleum jelly.

English Violet Soap (Cold)

Cochin coconut oil	32 kilos.
Tallow	10 "
Palm oil	1 kilo. 500 c.c.
38° Bc. caustic soda lye	21 kilos. 100 "
Pulverised orris root	1 " 500 "
" curaçao bark	1 " 500 "
Liquid styrax	1 " 500 "
Lavender oil	300 grams
Bergamot oil	100 "
Bergamot	40 "
Safrol	100 "
Balsam of Peru	100 "
Cassia oil	10 "
Artificial musk	10 "
Orris resinoid	50 "

Transparent Glycerine Soap.—Toilet soaps made from disintegrated soap, put up in a pleasing shape and suitably perfumed, have to a great extent superseded soaps made by saponification at low temperatures. However, the public still shows a certain predilection for transparent glycerine soaps. These are perfumed with natural flower oils.

The following are formulæ for glycerine soaps of this type:—

Tallow	90 kilos.
Cochin coconut oil	90 "
Castor oil	60 "
Glycerine	52 "
Water	22 "
33° Bc. caustic soda lye ..	142 "
Alcohol	76 "

Transparent Glycerine Soap without Alcohol

Best tallow	60 kilos.
Cochin coconut oil	74 "
Castor oil	76 "
38° Bc. caustic soda lye ..	108 "

Mix with:—

Distilled water	11 kilos.
Crystallised soda	18 "
Sugar	60 "

and dissolve in:—

Distilled water	64 kilos.
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The tallow, coconut oil, and castor oil are first melted together, then the 108 kilos. of caustic soda lye with 10 litres of distilled water are added to the mixture at about 55°. The mass is then warmed and when the required temperature is

reached it is stirred as in ordinary saponification. After this is finished, it is left in a covered boiler for one or two hours; when it has become transparent, it is stirred to the bottom to make sure that saponification is complete. The 18 kilos. of crystallised soda are added, the boiler is covered after mixing, and it is left for fifteen or twenty minutes. Meanwhile, the 60 kilos. of sugar are dissolved in the 64 litres of distilled water and added to the mass, which immediately becomes more fluid. The temperature is raised to 70–80°. The soap is now ready for the perfumes and colour and to be strained into moulds.

Glycerine soaps are greatly benefited by being kept for two or three weeks after shredding and before being finally shaped; their transparency being thus increased if they have been properly made.

Perfumes for Glycerine Soaps

Fine glycerine soaps are of a clear yellow colour, which is the best for showing up their transparency. Some soaps, however, are of a deeper colour, caused by the perfume added to them, for example, gum benzoin and violet soaps. The following perfumes are used for glycerine soaps.

<i>Rose</i>	
Palmarosa oil	350 grams
Lavender oil	10 ..
Geraniol	50 ..
Linalol	10 ..
Tincture of musk	150 ..

Colour: clear yellow (aniline yellow).

<i>Maguel</i>	
Liquid orange oil	50 grams
Linalol	400 ..
Synthetic neroli	40 ..
Anethole	50 ..
Santalwood oil	40 ..
Dianthin	20 ..
Tincture of artificial musk	150 ..

Colour: bright green.

<i>Gum Benzoin</i>	
Pulverised gum benzoin	900 grams
Liquid styrax	400 ..
Infusion of gum benzoin	400 ..
Balsam of Peru	100 ..
Citral	10 ..
Oil of lemon	20 ..
isoEugenol	20 ..
Vanillin	3 ..

<i>Violet</i>	
Bergamot oil	60 grams
Bergamiol	20 "
Liquid orris oil	20 "
Balsam of Peru	100 "
Infusion of gum benzoin	400 "
Tincture of artificial musk	50 "
Terpineol	40 "
Linalol	6 "

<i>Hyacinth</i>	
Hyacinth	200 grams
Oil of bitter almonds	5 "
Bourbonal	6 "
Geranium oil	60 "
Tincture of artificial musk	50 "

The amount of these perfumes used varies according to the cost price of the soap.

Liquid Glycerine Soaps.—This is a transparent, perfumed soap which does not solidify at room temperatures, having the consistency of honey. Soaps of this kind possess great cleansing power and at the same time soften the skin. They are generally of a clear yellow or golden-yellow colour. They are made according to this formula :—

Oleine	10 kilos.
Lard	5 "
38° B \acute{e} . caustic potash lye	6 "
28° B \acute{e} . potassium carbonate lye	3 kilos, 900 c.c.
24° B \acute{e} . glycerine (free from lime)	50 "
Oil of lemon	1 kilo.
Geraniol	250 grams
Lavender oil	500 "
Thyme oil	500 "
Tincture of artificial musk	50 "

Put the glycerine in a steam heater and heat to 75°. Melt the lard in it and add the oleine. When the whole is melted add the caustic potash, stirring without ceasing. then add the solution of potassium carbonate, cover the heater, and leave it all night. Perfume and colour the soap the next day and put it into bottles.

Liquid Soaps for Automatic Distributors, etc.

The best soaps of this kind are potassium soaps made with coconut oil, palm oil, or castor oil, in addition to solutions of potash, potassium chloride, and sugar. They have the advantage of not drying up. Soaps in which a solution of sugar and glycerine is used have a good consistency. The following is a useful formula :—

TOILET SOAP AND VARIOUS PRODUCTS 383

Coconut oil	50 kilos.
50° Bé. caustic potash lye	27 "
Water	13 litres
24° Bé. glycerine	25 "
Sugar	75 kilos.
Dissolve in water	300 "

The coconut oil is saponified with the caustic potash, added to the 13 litres of water at a temperature of 80–85°, and the boiler is then covered.

The alkalinity of the soap is regulated by using a solution of phenolphthalein and a little caustic lye or oil added as necessary to obtain neutrality of the soap. Finally, the glycerine and sugar solution are added, preferably warm, and the soap is left standing to deposit and become clear. It is then decanted, or filtered if necessary, slightly perfumed, and then poured into containers. For the best quality soap, the glycerine is increased and the sugar decreased. The following are typical formulæ:—

	I	II
Coconut oil	43 kilos.	40 kilos.
Castor oil	7 "	10 "
Potash lye, 50° Bé.	25 kilo, 5 c.c.	24 kilo, 5 a.c.
Carbonate of potash solution, 20° Bé.	6 kilos.	—
Water	124 litres	—
Sugar solution, 20 per cent.	—	300 litres
Carbonate of potash solution, 5° Bé.	—	130 "

These soaps should be slightly perfumed. Citronella oil is not recommended, but terpineol alone or combined with peppermint is useful. A very fragrant perfume, and a very economical one, can be produced by the use of oil of Siberian pine leaves. It can be used alone, or combined with a little aubepine, oil of linaloe, or coumarin. These soaps are packed in glass bottles with wide mouths, their size being comparable to that of the distributor, which enables the user to consume a whole bottle at a time without residues accumulating.

Soap in Tubes, for Travellers, etc.

These soaps should be white, liquid, neutral, and should give an abundant lather. They are prepared as follows:—

Suet	15 kilos.
Coconut oil	3 kilos. 750 c.c.
Potash lye, 35° Bé.	7. " 500 "
Soda lye, 35° Bé.	2 " 500 "

The fats are melted and heated to 60°, and the caustic mixture is added gradually, with stirring, until reaction is complete,

which usually requires one to two hours. The paste is then transferred to an enamelled pan and allowed to stand for a couple of hours and then well mixed with the perfume, and, if any, the medicaments.

Perfume for Soap Tubes

Oil of lavender	100 grams
Oil of geranium (artificial)	50 "
Linalol	20 "
isoEugenol	10 "
Tincture of musk	20 "
Heliotropin	15 "

From 300 to 400 grams of this may be used for 50 kilos. of soap. The soap is then transferred to a filling machine, and filled into ordinary squeeze tubes of the necessary size.

Medicated and disinfecting soaps are of importance, as they are used by doctors in hospitals, as well as in private practice. Carefully used, a tube does not become infected by the patient.

Medicated soaps employed for massage are also usefully packed in tubes. The medicament is most easily added to the soap in paste form.

The following are typical examples of medicated soaps :—

Arnica soap : 10 per cent. of tincture of arnica and 1 per cent. of lanoline.

Arsenic soap : arsenic as prescribed and 2 per cent. of camphor.

Benzoin soap : 9 per cent. of benzoic acid and 2 per cent. of lanoline.

Russian tar soap : 12 per cent. of tar.

Borax soap : 10 per cent. of borax.

Borax and lanoline soap : 8 per cent. of borax, 1 per cent. of lanoline and 3 per cent. of glycerine.

Boric acid soap : 10 per cent. of boric acid.

Creolin soap : 10 per cent. of creolin.

Ichthylol soap : 3 per cent. of ichthylol.

Carbolic acid soap : 10 per cent. of crystalline carbolic acid.

Lanoline soap : 8 per cent. of lanoline.

Lysol soap : 10 per cent. of lysol.

Lysoform soap : 10 per cent. of lysoform.

Balsam of Peru soap : 8 per cent. of balsam of Peru.

Petroleum jelly soap : 10 per cent. of petroleum jelly.

Shaving Soap

A suitable product is obtained as follows :—

Salt	45 kilo.
Lard	3 " 750 c.c.
Coconut oil	5 " 250 "
Caustic soda lye, 37° B ϵ	17 "
" potash lye, 40° B ϵ	14 " 250 c.c.
Glycerine	3 "

Perfume with 200 grams of oil of bitter almonds or benzaldehyde. A rose perfume may be substituted for the almonds, as follows :—

TOILET SOAP AND VARIOUS PRODUCTS 385

Oil of geranium	100 grams
„ palmarosa	40 „
„ cassia	10 „
Cinnamon (dissolved in 100 c.c. alcohol)	30 „

Shaving Creams

I

Lard	3 kilos, 500 c.c.
Potash lye, 25° Bé.	1 kilo, 875 „
Alcohol	100 grams
Mirbane	30 „
Peppermint oil	3 „

II

Olein	7 kilos, 500 c.c.
Olive oil	15 „
Coconut oil	2 „ 500 c.c.
Potash lye, 24° Bé.	22 „ 500 „
Soda lye, 36° Bé.	5 „

III

Lard	4 kilos, 500 c.c.
Coconut oil	500 c.c.
Potash lye, 36° Bé.	2 kilos.
Soda lye, 36° Bé.	500 c.c.

Nos. 2 and 3 are, after making, left for several hours, then well mixed and a little alcohol added, when they take on a brilliant, pearly lustre. They are stored in well-covered vessels and packed in small china pots. A fourth formula is as follows:—

Lard	1 kilo.
Arachis or sesame oil	800 grams
Coconut oil	700 „
Potash lye, 40° Bé.	1 kilo, 250 c.c.
Solution of carbonate of potash, 15° Bé.	150 grams

The fats are melted at 35°, well stirred with the alkali until pasty and the perfume added. Almond is the most usual perfume, or, alternatively, rose or violet.

Rose Perfume.—Geranium oil, 60 grams; artificial otto of rose, 10 grams; oil of cloves, 20 grams; infusion of musk, 40 grams; sandalwood oil, 10 grams.

Violet Perfume.—Ionone, 50 grams; oil of bergamot, 100 grams; liquid oil oforris, 15 grams; artificial musk, 5 grams.

From 10 to 20 c.c. of perfume are used for 1 kilo. of the soap.

Stearate Shaving Creams:

Stearic acid neutralised with alkali forms the basis of these soaps. As they usually contain a little free stearic acid, and as they also contain much water, they are liable to deteriorate by

exposure, and are therefore packed in squeeze tubes or well-closed metallic boxes. The formula for this type of soap is as follows :—

Stearine	1 kilo.
Distilled water	8 l. 200 c.c.
Glycerine, 24° Be.	600 grams
Ammonia (sp. gr. 0.910)	200 ..
Geranium oil	30 ..
Terpincol	15 ..

The stearine is melted in a pan, and in a second pan the ammonia, glycerine, and water are mixed and heated to 55-60° and then worked into the melted stearine, with constant stirring. A transparent, gelatinous mass results, to which the perfume is added. The mass is kept in earthenware pots in a cool place. The cream has a pearly-white appearance. The stearine can also be treated with caustic or carbonate of potash or soda, as follows :—

	I	II
Stearine	1 kilo.	1 kilo.
Water	8 litres.	8 l. 330 c.c.
Glycerine	600 grams	500 grams
Soda lye, 15° Be.	300 ..	
Geranium oil	100 ..	
Eucpul	20 ..	
Potash lye, 18° Be.		255 grams
Terpincol		140 ..
Anbepine		10 ..
Robinia		10 ..

Shaving Sticks

For shaving sticks the best-quality white soap is employed. It is shredded and then milled. Shaving cream is added in quantity corresponding to the consistency of the soap.

Best white soap	40 kilos.
Shaving cream	10 "
Oil of almonds	100 grams
Terpincol	100 ..
Heliotropin	10 ..

The sticks, as they come from the moulder, should not be too soft; if they are too soft, a little soap powder should be used to harden them.

Shaving Soap Powder

The use of powdered soap for shaving is popular in France, Italy, and Switzerland. It is made with white soap, to which is added either powdered rice, powdered orris root, or almond meal. The soap is shredded, and dried until it can be powdered

between the fingers, and then triturated with the perfume. After five to six hours, to allow the perfume to be well absorbed, the powder is sieved twice, and is then ready for use.

A powdered soap can be made by saponifying in the cold as follows :—

Suet	72 kilos.
Castor oil	4 ..
Coconut oil	12 ..
Soda lye, 37° Bé.	22 ..
Potash lye, 30° Bé.	27 ..

When the soap is dried and powdered, it is finished off as follows :—

I	
Powdered soap	30 kilos.
“ rice	4 ..
Perfume	100 grams

II	
Powdered soap	30 kilos.
“ oils	1.5 ..
Almond meal	1 kilo
Perfume	140 grams

The perfume usually employed is oil of bitter almonds. Rose or violet perfume may also be employed.

Violet

Infusion of orris	100 grams
Synthetic violet (fouone)	15 ..
Essential oil of orris	10 ..
Irolene	5 ..
Bergamot oil	60 ..
Cananga oil	10 ..

Rose

Geranium oil	100 grams
Rose oil (artificial)	15 ..
Ess. Eugenol	10 ..
Oil of bois de rose	25 ..

These powders should be kept in well closed metal containers, or they will absorb moisture.

ESSENCE OF SOAP

The product known under this name is only white Marseilles soap dissolved in alcohol. Generally a little potassium carbonate is added, but this is for some unknown reason and is probably useless, since it is totally insoluble in alcohol. The solution when filtered is perfumed according to taste. This substance is of no importance commercially.

FLOATING AND PUMICE-STONE SOAPS

Soaps which float on water as a cork does are merely soap dissolved in water and beaten, as one beats white of egg, until sufficient air has been beaten in to convert it into a permanent solid "lather." On a commercial scale, the process must be carried out in jacketed pans, etc., as the fats usually employed are those easy to emulsify, such as coconut, palm, palm-kernel, or olein, but not suet. The cuttings of cold process soap can also be used, as these are difficult to use up, especially when they contain silicates. A hundred litres of water are heated to boiling point, and 50 kilos. of soap cuttings, in a fine state of division, are added. When melted, the mass is stirred with accelerating speed, the temperature being kept at about 37°. The mass slowly increases in volume as air is beaten in until it occupies twice its original volume. Stirring is maintained until the mass is uniform in consistency. It is then perfumed and divided into batches and allowed to dry for a time depending on the amount of moisture originally present. The colour will, of course, depend on that of the cuttings used, and can be modified as desired.

Pumice-Stone Soap.—This is usually prepared with the cuttings from the manufacture of small soap tablets, which are melted with varied proportions of finely-ground pumice-stone or quartz. It is coloured and perfumed to taste and finished off in the ordinary manner.

Although this soap is remunerative, it is not recommended for general purposes, as the powdered pumice or quartz acts detrimentally on the various parts of the machinery.

HYALINE BLOCK OR ALUM STONE

This substance is to-day largely employed by barbers. Applied to the face after shaving it contracts the pores of the skin and assists in protecting it from exposure to cold and from bacterial infection. The epidermis is exceedingly sensitive to all external influences after shaving, and also to the lathering with the brush—so much so that in some countries barbers are forbidden to use shaving-brushes except those belonging to the individuals to be shaved.

The alum block tends to remedy, or alleviate, these troubles.

It is composed principally of alum, which explains its action on the skin. Alum is dissolved in its own weight of water, which is then evaporated, a little glycerine and a trace of corrosive sublimate to increase the germicidal action being added. Sometimes a little menthol is added, to produce a refreshing effect after the "feu de rasoir." The mixture, when nearly free from water, is poured hot into moulds and solidifies to the well-known crystalline blocks, which are rubbed with hot water on the surface to make them smooth, and are then ready for sale.

Rohde has taken out a patent for their manufacture, as follows: alum is liquefied on a water-bath in its own water of crystallisation, and to it is added 1 per cent. of formalin, 5 per cent. of borax, 1 per cent. of glycerine, and 0.5 per cent. of zinc white. The mixture is then poured into moulds. It is non-poisonous; the alum is soothing and astringent, the formalin is antiseptic, the borax aids in stopping bleeding, the glycerine softens the skin, and the zinc oxide has a healing effect.

The mass, however, is rendered less transparent by these additions. To obtain crystal-clear blocks, it is necessary to crystallise alum in large pieces, saw it into small blocks, and polish the surfaces with boiling water. A little formalin or other disinfectant can be added to liquefied alum without altering its transparency.

CHAPTER XVI

SPECIALITIES AND SECRET PREPARATIONS

THE field of cosmetics is a wide one where every one may glean at will. It is thus that so many products are placed upon the market for the care of the skin, the hair, the teeth, etc. Amongst these there are those which are really valuable, those which are passable, and those which, frankly, are bad, fail to achieve the desired end, and are generally offered at grossly exaggerated prices. One may, in fact, say that there are two classes of manufacturers, the competent ones and the incompetent. Further, many of the products mentioned in this chapter are made and sold by pharmacists, who should possess sufficient skill to prepare a first rate article. If they manufacture a useless product, they deliberately become quacks. The pharmacist, however, usually has too much professional dignity to lend his name to useless and inefficacious products. In the sequel are given some indications of the composition of a number of proprietary articles, it being understood that the details are not intended to represent the actual composition of the articles.

Abt's Distilled Horse Grease.—Said to assist the growth of the hair. Match with 2 parts of castor oil and 5 parts of olive oil.

Abt's Hair Dye.—Match with No. 1 solution of pyrogallie acid, No. 2 solution of nitrate of silver in ammonia, No. 3 solution of potassium sulphide.

Afra.—Hair dye. Use sulphate of copper and a chromium salt.

African Hair Dye.—This is sold in two separate solutions. Match by: (1) solution of paraphenylenediamine; (2) hydrogen peroxide *vide* Aurcole and Phenix.

Allen's Hair Vigour.—Match with 3 parts, acetate of lead, 2 parts of sulphur, 14 parts of glycerine, and 8 parts of water.

Allen's World's Hair Restorer.—Match with 17 grams of precipitated sulphur, 10 grams of tincture of cinnamon, 320 grams of glycerine, 26.5 grams of acetate of lead, and 630 grams of water.

Ambrosia.—Hair dye. Contains about 1 per cent. of acetate of lead.

Anticrinine.—A depilatory. Based on sulphide of strontium.

Antipsilothron.—Remedy against hair falling out. Match with an alcoholic extract of gall-nuts.

Antoline.—Depilatory. Based on sulphide of barium.

Aphrodite.—Hair dye. Match with an alcohol aqueous solution of chloride of copper, chloride of iron, hydrochloric acid, pyrogallol.

Aricine (pomade d').—For the care of the hair. Match with an ordinary perfumed pomade.

Audilano's Nut Extract.—Contains chlorides of iron and copper and pyrogallic acid.

Aureole.—Hair dye. Consists of 2 liquids. Match as follows: (1) 1 per cent. of metol, 0.3 per cent. of amidophenol hydrochloride, 0.6 per cent. of monoamidodiphenylamine, 0.5 per cent. of sulphite of soda, and 98 per cent. of 5 per cent. alcohol (2) solution of peroxide of hydrogen, 3 per cent. All shades from blond to black can be obtained with this solution. Observations made by Dr. Schutz show that this dye produces at times irritation of the skin. The patentee, Dr. Erdmann, recommends the dye only for dead hairs, such as toupés and wigs.

Auroline.—Blond hair dye. Match with 2000 parts of hydrogen peroxide, 3.5 parts of sulphuric acid, and 7 parts of hydrochloric acid. Mix and allow to stand in a dark place, then bottle off.

Auriconns.—This is similar to the last mentioned.

Aurore.—Blond hair dye. Match with a solution of peroxide of hydrogen 2.8 per cent., and hydrochloric acid 0.76 per cent.

Ayer's Indian Hair Balsam.—Match with water, glycerine, sulphur, and acetate of lead.

Beard Pomade, Roger.—Match with 1 part of powdered cinchona bark and 1.5 parts of a fat pomade containing a little wax. Similar preparations are purely perfumed pomades, and beard lotions are often simply dilute alcohol, perfumed and coloured with a little tincture of gentian.

Bereuzon.—A product to increase the growth of the hair. Match with 3 parts of castor oil, 3 parts of balsam of Peru, 4 parts of tincture of cinchona, 85 parts of alcohol, and 40 parts of rose-water.

Beringuier's Vegetable Hair Dye.—Match with (a) a dilute

solution of pyrogallie acid in eau de Cologne, (b) a dilute solution of ferric chloride.

Böttger's Depilatory.—Match with 150 parts of calcium sulphide, 75 parts of glucose, and 75 parts of starch, perfumed.

Boudet's Depilatory.—Match with 3 parts of sodium sulphide, 10 parts of quicklime, and 10 parts of starch.

Brandt's Dutch Capillary Balm.—Match with 1 part of tannic acid, 75 parts of white wine, 10 parts of alcohol, and traces of acetic ether.

Brasiline.—Described as a non-metallic hair dye. Match with a concentrated solution of potassium permanganate.

Braun and Jacoby's Hair Lotion.—A very greatly praised antiseptic acid hair restorer, composed of: quinine 0.14, glycerine 5 per cent., alcohol 89.8 per cent., water 25 per cent., balsam of Peru 2 per cent., inactive perfumes, and traces of lead (Ph. Z.).

Brown's Pomade Philocome.—Match with an ordinary pomade, with 5 per cent. of pyrogallie acid and a trace of potash.

Brylon.—Hair dye. Match with solution of nitrate of silver, etc.

Buhlingen's Hair Preservatives.—Match with (1) a pomade containing 15 per cent. of cocoa butter; (2) a "preservative," containing 20 parts of tincture of arnica, 5 parts of glycerine, and 50 parts of water, and (3) a "shader" which is tincture of arnica, and (4) tannic acid soap.

Buhlingen's Rhusma.—Match with 15 parts of lime, and 3 parts of sulphide of arsenic.

Bully's Aromatic Vinegar.—Match as follows: 150 grams alcohol, 625 grams eau de Cologne, 30 grams balsam of Peru, 500 grams tincture of benzoin, 60 grams acetic acid (60 per cent.), 2 grams oil of mace, 80 grams lemon oil, 1 gram oil of lavender, 5 grams oil of bergamot, 10 grams tincture of musk. Mix the ingredients, allow to stand for three weeks and filter with carbonate of magnesia.

Butte's Depilatory.—Match with 3 parts of tincture of iodine, mixed cautiously with a mixture of 6 parts of turpentine oil, 8 parts of castor oil, 48 parts of alcohol, and 60 parts of collodion.

Cactus Pomade de.—This is sold as a hair developer. Match by bruising 125 parts of thorny cactus, boil with water, add turmeric and soluble indigo to colour, and filter the liquid. Then add 750 parts of water, 60 parts of glycerine, 15 parts of tannic acid, 7.5 parts of rosemary oil, and 4 parts of fennel oil.

Capillurine.—Match with alcohol, onion juice, cognac, balsam of Peru, and fat.

Capillary Balm, Marquart.—Match with nitrate of lead and sulphur.

Capilline.—This is suggested as a substitute for captol (*q. v.*). It is a condensation product of chloral hydrate, tannic acid, and resorcin. It is a chocolate-coloured powder, soluble in alcohol, insoluble in cold water, glycerine, chloroform, and ether. Its alcoholic solution mixes to a clear solution with castor oil. It is partly soluble in boiling water. Mindes, the inventor, gives the following prescriptions: *Eau capilline*: 1 gram of capilline, 1 gram of chloral hydrate, 0.5 gram of salicylic acid, 2 grams of alcoholic solution of soap—then add 70 per cent. alcohol to 100 grams. Perfume with 5 drops each of mirbane, geranium oil, and lavender oil. *Capilline oil*: 2 grams of capilline, 2 grams of chloral hydrate, 64 grams of 96 per cent. alcohol, 30 parts of castor oil, and 3 drops each of mirbane, lemon oil, and lavender oil. *Pomade capilline*: 2 grams of capilline, 1 gram of salicylic acid, 10 grams of 96 per cent. alcohol, 27 grams of castor oil, 50 grams of cocoa butter, 10 parts of spermaceti, and 5 drops each of mirbane, oil of geranium, and oil of lemon.

Capilliphore.—A hair lotion, slightly turbid, pale yellow, perfumed, slightly acid, of specific gravity 0.937. Match with water, alcohol, butyric ether, and traces of resin.

Captol Hair Lotion.—This is a medicinal preparation, in the form of a dark brown powder, hygroscopic and only slightly soluble in cold water, but more so in hot water and in alcohol. It is unaffected by acids, but is decomposed by alkalis, which turn it black. It is employed as a hair lotion in the form of a 1 to 2 per cent. alcoholic solution. From the chemical point of view, captol is a combination of chloral and tannic acid. As a remedy for scurf and dandruff it is employed as follows: Captol, tartaric acid and resorcin, 1 gram of each, salicylic acid 0.7 gram, castor oil 0.5 gram, 65 per cent. alcohol 100 grams; and perfume to taste. Captol pomade is prepared as follows: Captol and tartaric acid, 1 to 2 grams of each, lanoline 5 grams, petroleum jelly 90 grams; perfume to taste. The addition of 5 per cent. of sulphur is useful in removing old dandruff, etc.

Ca y est.—(Beard fixer—de Haby). To match this use extract of malt 5 parts, alcohol 7.5 parts, and saturated solution of salicylic acid 100 parts.

Chromocome.—Match with two solutions, (1) tincture of gall-nuts; (2) solution of nitrate of silver and acetate of iron.

Circassian Bain. Hair dye. Match with acetate of lead and sulphur.

Claridat.—Hair dye. Match with acetate of lead and milk of sulphur.

Colorogene.—Hair dye. Match with silver nitrate.

Comochrome.—Hair dye. (1) Solution of pyrogallol, (2) solution of silver nitrate.

Crinine.—Ammoniacal nitrate of silver.

Dandruff Cure.—Chloral hydrate 62.5 grams, resoreine 31.25 grams, tannic acid 31.25 grams, alcohol 236.5 c.c., glycerine 118.3 c.c., rose-water 227.2 c.c. Work this into the affected part, assisted by a comb, every day at first, then twice, and finally once a week.

Danneey's Hair Dye.—Match with hyposulphite of ammonium 30 grams, acetate of lead 15 grams, water 1 litre, alcohol 15 grams, glycerine 15 grams, oil of bitter almonds 10 drops.

Depilatory Paste-Burning.—Calcium sulphide perfumed with musk.

Dupuytren's Pomade.—Match with 250 parts of beef suet, 4 parts of acetate of lead, 8 parts of balsam of Peru, 30 parts of alcohol, and 1 part each of tinctures of cantharides, cloves, and cinnamon.

Eau d'Afrique.—Hair wash composed of three solutions: (1) a solution of silver nitrate, (2) a solution of 8 per cent. sodium sulphide, (3) a perfumed solution of silver nitrate.

Eau d'Ange (E. Ange of Paris' hair lotion).—Contains pilocarpine as its active element.

Eau de Castille.—A hair dye containing 10.16 per cent. of sodium hyposulphite, 1.67 per cent. of lead acetate. The remainder is water.

Eau Charbonnier.—A hair dye composed of two solutions: (1) a solution of 1 per cent. pyrogallol, (2) about 2 per cent. silver nitrate, 0.89 per cent. copper sulphate, 4 per cent. ammonia, and 93 per cent. water.

Eau de Fies.—Contains 0.21 per cent. lead oxide, 5.46 per cent. sodium hyposulphite, 1.35 per cent. glycerine, 0.39 per cent. ammonia, and 92.5 per cent. water.

Eau de Figaro.—A hair dye containing lead sulphide. Another product of this name is composed of (a) a solution of silver nitrate containing copper sulphate, (b) a solution of sodium sulphide, (c) a solution of cyanide of potassium to remove the silver stains.

Eau de Zenoble.—This contains chiefly a solution of sodium hyposulphite, sodium sulphate and acetate, a little free acetic acid and lead sulphide.

Eau Gold Feen.—Is the same as Auréoline.

Eau Sublime de Feuilles.—An inoffensive hair dye containing glycerine, sulphur, and 1.5 per cent. lead sulphide.

Erasmus Wilson's Hair Wash.—Composed of: 3000 parts of oil of almonds, 3000 parts of ammonia, 2500 parts of rosemary alcoholate, 60 parts of tincture of cantharides, and 35 parts of oil of lemon (Ph. C.).

Firoline.—A hair balsam composed of wax, fat base, balsam of Peru, and inactive perfumes.

Fos.—(A dye for the beard). It is a solution of 2 per cent. paraphenylenediamine, which applied to the beard with a solution of 2 per cent. sodium hydrate dyes it black.

Glycobastol.—A hair wash which, according to Dr. Weller, is composed of different essences dissolved in a yellow liquid containing 35.22 per cent. alcohol, 61.64 per cent. glycerine. It contains also 0.19 per cent. of a body similar to cardol, of a very bitter taste (probably capsaicin).

Hair Lotion to stop hair falling out. Resorcin 2.5, chloral hydrate 5, tannic acid 5, tincture of benzoin 1.5, castor oil 4, alcohol to 250 grams. This lotion gives good results.

Jaborandi Hair Tonic.—For strengthening the hair. Contains 1 gram cantharidin, 0.2 gram of pilocarpine, 50 grams of acetic ether, 2000 grams of rectified spirit, 60 grams of castor oil, 40 drops of rosemary oil, 12 drops of neroli oil (W. D.).

Kallomyrin.—A hair dye in pomade form containing in addition to the usual fat base, lead carbonate, sulphur, and a little tincture of cantharides.

Kascha.—A hair dye composed of an alcoholic solution of pyrogallol, and a perfumed ammonia solution of silver (Ch. Z.).

Kohl or Kohenl.—A dye greatly used in England and even in France. It is simply a solution of Indian ink in rose-water. It is made by dissolving about 15 grams of Indian ink in a fine powder in $\frac{1}{4}$ litre of boiling rose-water.

Kosirol.—Hair dye. Paraphenylenediamine base.

Krinochrome.—Hair dye. Alcoholic solution of pyrogallol, and an ammoniacal solution of silver nitrate. Another product of this name has been found to consist of: (1) pyrogallic acid dissolved in a mixture of rectified wood vinegar and alcohol in equal parts, and (2) a solution of 30 parts of nitrate of silver

in 900 parts of distilled water, with ammonia, *q.s.* to dissolve the precipitate first formed.

Kuhn's Nut Extract.—Match with pyrogallie acid and azo-dyes.

Lanoline hair lotion.—Digest 4 parts of quillaia bark in 36 parts of water for four days, decant and add 4 parts of alcohol. Filter the liquid. To 40 parts of the filtrate, heated to the melting point of lanoline, add 12 parts of anhydrous lanoline and make up to 300 parts with 15 per cent. alcohol. A little extract of cinchona, balsam of Peru, quinine, tincture of cantharides, ammonium carbonate, menthol, etc., may be added. The preparation is a yellowish, milky liquid with an oily layer which is easily mixed in by shaking. It is one to be well recommended.

Lason's Hair Elixir.—Match with a solution of salt and tannic acid.

Laszar's Hair Cure.—The hair should be well washed every day with a strong tar soap, then rinsed well and dried. The tar soap may be replaced by a mixture of 15 parts of carbonate of soda, 15 parts of carbonate of potash, 70 parts of soap, and 200 parts of rose-water. Afterwards the hair is well rubbed with: (1) a solution of 0.6 part of mercuric chloride in 25 parts of alcohol, 25 parts of glycerine, and 250 parts of water; (2) a 0.1 per cent. solution of β -naphthol in alcohol; (3) oil containing 2 per cent. of salicylic acid. The treatment should be applied regularly every day for several weeks.

Laszar Pomadè for Baldness.—This contains 2 grams of pilocarpine hydrochloride, 4 grams of quinine sulphate, 10 grams of precipitated sulphur, and 20 grams of balsam of Peru, in 80 grams of beef tallow.

Leyten's Hair Dye.—(1) Solution of nitrate of silver, coloured with aniline blue; (2) a dilute solution of calcium sulphide.

Lorocraine.—This is an American hair-growing remedy. It is said by the maker to contain naphthol, yolk of egg, tannic acid, oil of jasmine in a fatty oil, tinctures of arnica and sage, and cognac. It is very expensive. It has been said that a similar preparation consists of a solution of resin soap in alcohol and water, coloured and perfumed.

Mde. A. Tennul's Depilatory.—According to an analysis made in the Dresden municipal laboratory this is nothing but melted pine resin.

Melanochrome.—The usual pyrogallie acid and nitrate of silver solutions match this dye.

Melanogene.—Matched by: (1) 10 grains of carbonate of magnesia and 20 grams of glycerine in 30 grams of distilled water; (2) 10 grams of potassium chromate, 30 grams of glycerine, and 80 grams of water. The two are mixed as desired to give varying yellow shades of a creamy paste.

Moustachine.—Match with 120 grams of mastic resin, 35 grams of soap, 150 grams of castor oil, 17½ grams of lavender oil, and 2.5 kilos. of alcohol. Macerate for four days and filter.

Naphthol Hair Lotion.— β -Naphthol 20 parts, glycerine 100 parts, rum 100 parts, alcohol 280 parts, orange-flower water 100 parts, distilled water 400 parts, bergamot oil 1 part, otto of rose 0.5 part, vanillin 0.1 part, spearmint oil 2 drops. Mix and filter.

Naquet's Hair Lotion.—Match as follows: 50 parts of bismuth subnitrate and 100 parts of cream of tartar are boiled for thirty minutes with 600 parts of water. The liquid is decanted, and the residue boiled with 400 c.c. of water. The liquids are mixed and to the mixture is added caustic soda solution until faintly alkaline.

Neril.—Hair dye. Pyrogallie acid and nitrate of silver.

Neumann's Depilatory.—This is prepared by boiling together for half an hour 15 parts of sulphide of arsenic, 30 parts of burnt lime, and 5000 parts of 36° Bé. potash solution.

Nigritine.—Ammoniacal solution of silver nitrate.

Oil of Nut Extract.—Boil 30 grams of green nuts in 350 c.c. of water, and dissolve in the mixture 3.5 grams of resorcin; filter and make up to 250 c.c. by adding water. Then add 15 grams of tincture of cantharides, 45 grams of glycerine, and perfumes as required.

Origo.—Match with an ammoniacal solution of bismuth with sulphur in suspension.

Papilline.—To prevent hair falling out. Match by extracting 15 parts of orris root with 100 parts of alcohol, and adding 50 parts of spirit of lavender and 15 parts of tincture of benzoin.

Peru Water.—Three parts of castor oil, 3 parts of balsam of Peru, 4 parts of tincture of rhatany, and 100 parts of alcohol.

Phenix.—Appears to be a paraphenylenediamine dye similar to Aurcole.

Phenomenal Hair Dye.—In two solutions: (1) a solution of pyrogallol; (2) a silver solution.

Philippsohn's Dandruff Liquid.—(1) Tincture of cantharides 10 grams, balsamic perfume mixture 10 grams, glycerine 3 grams, alcohol to 150 grams. The parts affected are to be well dressed

with this with a sponge. (2) Resorcin 1.5 grams, tannic acid, 1.5 grams, glycerine 3 grams, balsamic perfume mixture 10 grams, alcohol to 150 grams. This is also applied with a sponge.

Pinaud's Eau de Quinine.—According to Tscheppé (W. D.) this lotion contains no quinine, salicylic acid, tannin, cantharides, or metallic salts. The formulae given for it are: (1) tincture of rhatany 2 parts, tincture of cantharides 1 part, alcohol 50 parts, lavender alcoholate 5 parts, glycerine 7.5 parts, sulphate of quinine 1 part; (2) sulphate of quinine 2 parts, tincture of cantharides 20 parts, tincture of rhatany 40 parts, lavender alcoholate 100 parts, glycerine 150 parts, alcohol 1000 parts, cognac 250 parts, eau de Cologne 250 parts; (3) alcohol 250 parts, alcoholic solution of soap 100 parts, tincture of cinchona 50 parts, balsam of Peru 25 parts, bergamot oil 10 parts, oil of orange 10 parts, geranium oil 10 parts (W. D.).

Puebla's Mexican Balsam.—A sulphide of potash paste in water.

Puebla's Mexican Tincture.—A silver nitrate dye.

Puritas.—Hair dye. Match with 40 parts of glycerine, 100 parts of water, 3 parts of carbonate of soda, 15 parts of calcium sulphide, and 1.3 parts of sulphide of zinc.

Ractia.—Hair dye. Match with 11 per cent. of glycerine, 0.6 per cent. of lead acetate, a trace of caramel, and water to 100.

Rausch's Hair Lotion.—Match with alcohol 47.5, water 50.15, glycerine, quinine (and a substance not identified) 2.35 per cent.

Redwood's Depilatory.—Match with a paste of barium sulphide and starch.

Richard's Hair Dye.—(1) Pyrogallie acid; (2) nitrate of silver; (3) sulphide of potassium.

Roborantium.—A lotion for baldness. Match with glycerine and eau de Cologne. Another preparation of this name contains alcohol, nitric ether, acetic ether, ambergris, rose-water, glycerine, and perfume.

Russma Helvetia.—Match with strontium sulphide, chalk, oxide of zinc and peppermint oil.

Salicyl Shampoo.—Five hundred c.c. of rosemary water, 250 c.c. of rose-water, 175 c.c. of bay rum, 15 c.c. of ammonium carbonate, 15 grams of sodium carbonate, and 0.06 gram of salicylic acid.

Santa Violetta.—Hair lotion. Match with water, alcohol, glycerine and borax.

Sea Foam.—A dandruff remedy. Liquid soap 118 c.c., potassium carbonate 30 grams, alcohol 414 c.c., water 414 c.c. In the alcohol 2 c.c. of oil of bay should be dissolved. Colour with tincture of tumeric. If the disagreeable odour is not objected to, wood spirit may be used in place of alcohol, when the latter is more abundant and is easily removed by rinsing.

Shampoo Powders.—The following are various formulæ for shampoo powders: (1) borax 22.5, dried carbonate of soda 30, extract of quillaia 15, perfume to taste; (2) borax 90, dried carbonate of soda 180, powdered soap 90, perfume to taste; (3) borax 90, camphor 5, powdered cochineal 2.5, oil of rosemary to taste; (4) borax 30, dried carbonate of soda 30, camphor 1.2, oil of rosemary to taste; (5) carbonate of ammonia 1, borax 1, powdered quillaia bark 2, perfume with oil of bay.

Tea Lotion.—Fifty grams of bay rum, 50 grams of glycerine, 50 grams of alcohol, 350 grams of strong infusion of tea, (10 per cent.).

Tolma.—Match with 10 per cent. of glycerine and 90 per cent. of water tinted red and holding a little sulphur in suspension.

Tonic Shampoo.—Three hundred grams tincture of quillaia, 125 c.c. of Eau de Cologne, 100 c.c. of glycerine, 0.06 gram of pilocarpine nitrate, 2 grams of quinine sulphate, 1 litre of orange-flower water.

Trivogene.—Hair lotion. An alcohol-water solution of alkaline reaction, containing ammonia, boric acid, salicylic acid and glycerine.

Turkish Dye.—Gall nuts are reduced to fine powder, made into a paste with a little oil, and heated in a vessel until no oil vapours are given off. The residue is crushed and made into a thick cream with water, and mixed with salts of iron and copper. This is dried and the powder is known as Rastikipetra or Rastik Yazı. When perfumed with ambergris, etc., it is known as Karso. It has great tinctorial properties and softens the hair.

Vandaeli's Hair Powder.—A white, crystalline, inodorous powder, and almost entirely soluble in water. Match with 5 parts of salicylic acid, 5 parts of boric acid, and 45 parts of borax.

Vitaliné.—Match this hair lotion as follows: Sulphate of quinine 3 grams, alcohol 600 grams, oil of bitter almonds, 12 drops, tincture of capsicum 30 grams, aromatic vinegar 300 grams.

Waving Liquid.—(1) Colophony 12 parts, alcohol 1000 parts, perfumed with bergamot and musk; (2) caustic potash 15 parts,

ammonia (sp. gr. 0.960) 5 parts, glycerine 30 parts, rose-water 750 parts, orange-flower water 200 parts; (3) caustic potash 7 parts, ammonia (0.960) 3.5 parts, glycerine 15 parts, alcohol 42 parts, rose-water to 600 parts. In using these liquids, the hair is soaked with them, and then put into the ordinary curlers for the usual time.

Whitte's Hair Dye.—Match with acetate of lead and sulphur.

TOOTH WASHES AND PASTES

Agathol.—Match with an alcoholic solution of peppermint, with a little vanilla, and coloured red.

Alcool de Menthe—Riegles.—Match with an alcoholic solution of peppermint.

Alkaline Eau Dentifrice.—Bicarbonate of soda 5 grams, carbonate of ammonia 0.3 gram, tincture of myrrh 1 gram, eau de Cologne 10 grams, lavender water 3.75 grams, water to 175 grams,

Anatherine.—(Eau dentifrice). Match as follows: red sandalwood 25 grams, guaiac wood 25 grams, myrrh 15 grams, cloves 15 grams, cinnamon 10 grams, oil of cloves 2 grams, oil of peppermint 2 grams, cochineal 10 grams, alum 0.1 gram, caustic potash 0.1 gram, 96 per cent. alcohol 1500 grams, rose-water 500 grams. Macerate for eight days and filter.

Antiseptic Eau Dentifrice, Huchard.—Match as follows: boric acid 40 grams, eucalyptol 1 gram, salol 2 grams, menthol 0.25 gram, thymol 0.1 gram, alcohol 100 grams. Colour with cochineal, perfume to taste.

Azymol.—A yellowish-red liquid, with an odour of peppermint. It is an antiseptic suitable for a mouth-wash or a skin lotion. Match as follows: menthol 1 gram, oil of peppermint 2 grams, saccharine 1 gram, vanillin 0.5 gram, fuchsine a trace, tincture of rhatany 4 to 5 grams, alcohol (96 per cent.) 92 grams. A little salicylic acid may be added.

Carminol.—A powder of alkaline reaction for making into *eau dentifrice*, with a sweet taste and a peppermint odour. Match by mixing, carmine 0.5, sugar of milk 95, bicarbonate of soda 2, oil of peppermint 3.

Coca Tooth Paste.—Chalk 100 grams, powdered soap 30 grams, powdered cuttle-fish 30 grams, tincture of coca 50 grams, carmine to colour. Perfume with 20 drops each of oils of peppermint, rose, and ylang-ylang, and make into a paste with water.

SPECIALITIES AND SECRET PREPARATIONS 401

Comme-il-faut Tooth Powder.—Ten grams of finely-powdered pumice stone, 400 grams of chalk, 10 grams of chlorate of potash, 10 grams of powdered borax, 40 grams of silicate of soda in fine powder, 40 grams of salol, 1 gram of saccharine, 1 gram of otto of rose, 1 gram of oil of neroli, 1 gram of vanillin, 4 grams of oil of peppermint, 4 grams of aniseed oil and 40 grams of powdered orris root.

Cosmine.—This is a reddish-brown liquid with a marked peppermint and geranium odour, and may be matched as follows: water 40 per cent., alcohol 60 per cent., with traces (0.3 per cent.) of formalin, extracts of myrrh and rhatany, saccharine, and oils of geranium and peppermint to perfume.

Dentaline (Tooth Paste).—Match with 700 grams of powdered soap, 1000 grams of fine chalk, 50 grams of benzoic acid, 10 grams of thymol, 10 grams of myrtol, 40 grams of peppermint oil, and 1400 to 1500 grams of glycerine.

Diatomite Tooth Paste.—Fine kieselguhr 450, alum 150, myrrh 75, oil of cloves 3, glycerine 150. Colour with cochineal.

Diatomite Tooth Powder.—Fine kieselguhr 3000, levigated chalk 3000, powdered soap 3000, otto of rose 12, oil of cloves 60, oil of peppermint 30, sugar of milk 400.

Dorigny's Tooth Powder.—Match with powdered calcined bones 30, levigated chalk 25, powdered yellow cinchona bark 30, orris powder 15, cinnamon bark 13. Colour with carmine and flavour with peppermint.

Fränkel's Formaldehyde Mouth Wash.—Match with a solution of oils of peppermint, cloves and cinnamon in dilute alcohol containing 2 per cent. of formalin.

Priestley's Eau Dentifrice.—Match with 6 litres of 90 per cent. alcohol, 1.5 litres of water, 15 grams of oil of lemon, 40 grams of oil of peppermint, 10 grams of oil of fennel, and 25 drops of otto of rose.

Eau Dentifrice, Ebermann.—Match with orange peel 100 grams, cinnamon 50 grams, cloves 20 grams, aniseed 60 grams, sage 50 grams, benzoic 35 grams, cochineal 20 grams, alum 20 grams, alcohol 1000 grams, oil of peppermint 10 grams, and aniseed oil 3 grams.

Eau Dentifrice—Eugénie.—Match with rhatany root 100 grams, cinnamon bark 5 grams, water 80 grams, salicylic acid 1 gram, alcohol 200 grams. After filtration perfume with 10 drops of oil of peppermint, 2 drops of oil of cloves and 3 drops of oil of ylang-ylang.

Eau dentifrice, Forell.—To match this, macerate for eight days 18 grams each of aniseed, cloves, and cinnamon in 800 grams of alcohol and 400 grams of distilled water. Filter, and add to the filtrate oil of peppermint 12 grams, tincture of benzoin 12 grams, spirit of cochlearia 70 grams, and again filter.

Eau Dentifrice, Lefoulon.—Match as follows: tincture of vanilla 15 grams, tincture of pyrethrum 125 grams, spirit of peppermint 30 grams, spirit of rosemary 30 grams, spirit of roses 60 grams.

Eau Dentifrice, Miller.—Match with benzoic acid 3 grams, thymol 0.25 gram, tincture of eucalyptus or rhatany 15 grams, alcohol 100 grams, oil of peppermint 20 grams.

Eau Dentifrice, Pierre.—Match by macerating for three days 15 grams of aniseed in 200 grams of 90 per cent alcohol; filter and colour pale red. Perfume with 60 drops each of oils of peppermint and aniseed.

Eau Dentifrice, Putze.—Thymol 0.5 gram, menthol 0.5 gram, absolute alcohol 50 grams, tincture of rhatany 30 grams, peroxide of hydrogen (12 volumes) 120 grams.

Eau Dentifrice—Rutherford.—Match with boric acid 20 grams, oil of wintergreen 10 grams, glycerine 110 grams, alcohol 150 grams, water 600 grams. Or, thymol 0.25 gram, benzoic acid 3 grams, tincture of eucalyptus 15 grams, alcohol 100 grams, oil of peppermint 0.75 gram.

Elixir Dentifrice des Benedictins.—Digest for eight days in 10 kilos. of 96 per cent. alcohol, 300 grams of Mitcham peppermint oil, 50 grams of aniseed oil, 5 grams of calamus oil, 50 grams of bruised cochineal and 50 grams of cream of tartar. Filter. The cochineal and cream of tartar may be replaced by an aniline colour.

Kalodout.—Match as follows: dissolve 300 grams of soap in 1000 grams of glycerine and work into the solution 500 grams of precipitated chalk and 160 grams of calcined magnesia, so that it is incorporated into a smooth paste. Perfume with 4 grams each of cinnamon and peppermint oils, and colour with a solution of 0.5 gram each of carbonate of potash and carmine in 10 c.c. of water. An alternative method is as follows: Take 1 gram of carmine, 4 grams of 10 per cent. ammonia, 60 grams of 70 per cent. alcohol, 100 grams of precipitated chalk, mix and allow to dry in the air. Then add, chalk 300 grams, powdered orris root 100 grams, finely powdered pumice 50 grams, sugar flavoured with coumarin 5 grams, saccharin 0.1 gram, oils of peppermint

and neroli 150 drops each, oil of lemon 50 drops, oil of cinnamon 50 drops, oil of almonds 15 drops, otto of rose 5 drops, oil of spearmint 5 drops, tincture of vanilla 100 drops, éss-bouquet 150 drops. Well mix the whole with 50 grams of powdered soap, 200 grams of glycerine and 200 grams of gum arabic.

Naphthol Tooth Powder.—Chalk 500 grams, orris root 500 grams, β -naphthol 20 grams, soap powder 150 grams, carmine 60 grams, oils of lavender, lemon, and bergamot 7 c.c. of each, oil of wintergreen 128 drops, and otto of rose 40 drops.

Odol.—The composition of this has always been a matter of dispute, and the original proprietors have denied that any salol is present, although many published analyses claim that it is. It may well be that salicylic acid and phenol are added as ingredients and that some combination of the two takes place to form some salol. The following are claimed to be good copies of the original: (1) Water 16.7 per cent., alcohol 79 per cent., menthol 1.85 per cent., saccharine 0.041 per cent., salicylic acid 0.018 per cent., mineral matter 0.2 per cent., salol and methyl salicylate 2.05 per cent.; (2) 80 per cent. alcohol 97 per cent., salol 2.5 per cent., saccharine 0.04 per cent., peppermint oil 0.5 per cent., with traces of clove and caraway oils.

Odontine.—Match with soap 70 grams, chalk 180 grams, magnesium carbonate 145 grams, sugar 75 grams, carmine 0.75 gram, peppermint oil 6 grams.

Peroxide Tooth Paste.—Precipitated chalk 25 grams, soap 5 grams, glycerine and peroxide in equal parts to form a paste.

Phylacodont.—Soap glycerine, and chalk perfumed with peppermint oil.

Pulsinelli's Tooth Powder.—Match as follows: 25 grams of precipitated chalk, 5 grams of powdered cuttle fish, 5 grams of orris powder, 2.5 grams of myrrh, 12.5 grams of chlorate of potash, 6 drops of oil of peppermint. (The chlorate must be carefully mixed or an explosion may occur.)

Salol Tooth Powder.—Salol 5 grams, phosphate of lime 25 grams, chalk 25 grams, magnesium carbonate 25 grams, bicarbonate of soda 12 grams; oil of peppermint and carmine to taste. Another formula is, salol 4 grams, phosphate of lime 20 grams, chalk 20 grams, magnesium carbonate 20 grams, bicarbonate of soda 15 grams; perfume with peppermint oil.

Savon Dentifrice, Bergman's.—Match with powdered soap 35 grams, alcohol 20 grams, sugar 15 grams, and oil of peppermint q.s. Dry.

Savon Dentifrice, Frohmann.—Match with thymol 0.25, extract of rhatany 1 gram dissolved in 6 grams of hot glycerine, calcined magnesia 0.5 gram, bicarbonate of soda 4 grams, soap 30 grams, oil of peppermint *q.s.*

Stomatol.—A colourless tooth wash with slightly alkaline reaction. Match as follows: alcohol 70 per cent., water 25 per cent., glycerine 5 per cent.; add traces of soap, about 2 per cent. of oil of peppermint, and a trace of terpene hydrate. It is possible that a little pine resin is dissolved in the alcohol. This is a good germicide and quite harmless.

Tilit.—A tooth wash matched as follows: Alcohol 70 grams, tincture of myrrh 24 grams, anethol 2 grams, oils of peppermint and sage 3.5 grams, thymol 0.5 gram.

Tooth Powder, Jenkins.—Thirty grams of precipitated chalk, 15 grams of powdered orris, 7 grams of powdered soap, 7.5 grams of powdered pumice, and 8 drops of wintergreen oil.

Tooth Powder, Maury.—Wood charcoal 250 grams, cinchona bark 125 grams, sugar of milk 250 grams, oil of peppermint 15 grams, oil of cinnamon 8 grams, essence of ambergris 2 grams.

Tooth Powder, Simon.—Match with chalk, starch and orris root, coloured with carmine.

Trybol.—A tooth wash consisting of an alcoholic extract of various plants such as chamomile, arnica, sage, etc., perfumed.

Victoria Dentifrice.—Mix 500 grams of precipitated chalk with 7 c.c. of solution of carmine and 20 c.c. of water and dry. Add 120 grams of cuttle-fish powder, 30 grams of soap, 30 grams of borax, 30 grams of orris root, 120 grams of sugar, 40 drops of carbolic acid, and 7 c.c. of oil of wintergreen. Mix and sieve.

COSMETICS FOR TREATMENT OF THE SKIN

Agathine.—Match with benzoin, starch, oxide of zinc, silicate of magnesia, and water.

Agathol.—Match this powder with starch and tale, coloured with carmine and perfumed with rose.

Amandine.—Use 60 grams of gum arabic, 155 grams of honey, 100 grams of moist soap, 950 grams of fatty oil of almonds, and 2 grams of essential oil of almonds.

Baume de Glaciers.—To protect the skin against a hot sun. Oxide of zinc 12.5 grams, starch 12.5 grams, petroleum jelly 25 grams, lanoline 50 grams, a little cosin may be added to colour.

After use, the application is wiped away with a towel, and then washed away with soap and water.

Baume de Serail.—A so-called beauty preparation. Match with glycerine and water perfumed with rose.

Borated Talcum Powder.—Match this (1) with 250 grams of powdered boric acid, 2250 grams of finely powdered talc, and 15 c.c. of oil of geranium, (2) boric acid 125 grams, stearate of zinc 125 grams, talc 2250 grams, oil of jasmine 15 c.c. The boric acid should be mixed with the oil, the other ingredients added, and the whole sieved.

Borsyl.—To "prevent" perspiration. Match with boric acid 30 parts, silica 18 parts, magnesia 11 parts, borax 10 parts. Perfume.

Camphre Glacial.—Suet 18 parts, spermaceti 12 parts, white wax 12 parts, camphor 5 parts.

Cosmetoline.—Thirteen grams of lanoline, 13 grams of glycerine, 4 grams of tincture of benzoin, 1.75 grams of boric acid, perfumed with rose.

Crème Brésilienne.—Mixture of petroleum jelly, zinc oxide, and borax perfumed with neroli.

Crème-céleste.—White wax and spermaceti 80 grains each, fatty oil of almonds 600 grams, glycerine 160 grams, distilled water 120 grams, borax 5 grams, coumarin 0.03 gram. Otto of rose 1 gram, oil of bergamot 0.5 gram, oil of neroli 0.5 gram, oil of ylang-ylang 0.3 gram, oil of orris 0.1 gram, essence of ambergris 0.3 gram. Colour red.

Crème de Psyche.—For cracked lips. White wax 30 grams, fatty oil of almonds 150 grams. Melt and add 3.75 grams of balsam of Mecca, and 0.5 gram of lead acetate.

Crème d'Iris.—0.5 gram of borax, 2 grams of talc, 10 grams of oxide of zinc, 85.7 grams of glycerine ointment. Perfume with tuberosc.

Crèmes Simon.—Match as follows: *Crème jaune*: starch, oxide of zinc, talc and glycerine. *Crème de massage*: white petroleum jelly perfumed with vanilla. *Freckle cream*: borax, benzoic acid, glycerine and water, perfumed with neroli. *Crème de toilette*: powdered soap, starch, and glycerine, coloured with cochineal.

Cucumber Cream.—Wax 30 grams, spermaceti 30 grams, benzoated lard 475 grams; 6 cucumbers cut in slices, 10 grams of powdered borax. Melt the fats, add the cucumbers and the borax, stir well, allow to stand for twelve hours, melt and filter

through linen, cobt quickly and stir in another 10 grams of borax.

Eau de Ridy.—An excellent preparation to soften the skin and cure chapped hands. Match with propyl alcohol 50 grams, ethyl alcohol 20 grams, water 400 grams, ammonia 10 grams, chloroform 5 grams, ether 5 grams.

Eucalyptus Toilet Vinegar.—Extracts of cassie, violet and jasmine, each 30 c.c., otto of rose 10 drops, oil of neroli 4 drops, oil of bergamot 10 drops, eucalyptol 10 grams, alcohol 30 c.c., dilute acetic acid 175 grams.

Freckle Cream.—Solid fat with subnitrate of bismuth and perfumed with rose.

French Milk of Roses.—Mixture of benzoin 30 c.c., tincture of storax 30 c.c., otto of rose 10 drops, alcohol 15 c.c., rose-water 1 litre.

Glycerine Toilet Balm.—Zinc oxide 15 grams, glycerine 60 c.c., rose-water 60 c.c., carmine 0.03 gram, oil of neroli 2 drops, oil of bergamot 2 drops.

Honey and Almond Cream.—Soak, peel, and bruise 30 grams of bitter almonds, and rub the meal through a sieve. Mix it with the yellow of one egg and 60 grams of honey. Add 24 drops of lemon oil, 24 drops of clove oil, 30 drops of bergamot oil, and finally 60 grams of fatty almond oil and well mix.

Honey Cream for the Hands.—Honey 60 grams, soft soap 60 grams, solution of potash 4 grams, fatty oil of almonds 300 grams, oil of cloves 10 grams, oils of bergamot and bitter almonds 60 drops each.

Glycerine and Honey Jelly.—Mix 60 grams of glycerine with 27.5 grams of water, warm, and add 10 grams of honey and then 2.5 grams of gelatine. Perfume with otto of rose, and pour into tubes whilst warm.

James' Styptic Fluid.—To cure freckles. From 2 to 10 grams of hydrochloric acid, 25 grams of alcohol, 25 grams of rose-water and 5 grams of mucilage of gum arabic.

Kaloderm.—To soften the hands. Wheat starch 2 kilos., almond meal 500 grams, powdered orris root 500 grams, extract of rose 500 c.c., glycerine 175 c.c. Knead into a smooth paste.

Kalydor.—Match as follows: bruise 1000 grams of almonds, add 5 kilos. of rose-water and work into a homogeneous milk; strain, add 75 grams of ammonium chloride, 150 grams of cherry laurel; water and 1 gram of corrosive sublimate dissolved in 150 c.c. of alcohol.

SPECIALITIES AND SECRET PREPARATIONS 407

Lait Pomadour.—A beauty preparation. Glycerine and borax in water, with tincture of benzoin. Perfume.

Massage cosmétique (Dornier).—Oak bark 4 grams, aniseed 8 grams, thyme flowers 8 grams, sage leaves, rosemary twigs, hyssop twigs, lavender flowers, vermouth twigs, camphor and peppermint twigs, each 8 grams; macerate for fifteen days in 1 litre of 45 per cent. alcohol, add 4 grams of alum, allow to stand, and filter.

Menthol Cream.—For chapped hands. Alcohol 15 grams, menthol 2.5 grams, glycerine 12 grams, water 200 grams, powdered tragacanth 4 grams. Colour with carmine solution. Soak the tragacanth in the alcoholic solution and add the water warm.

Milk of Lilies.—Oxide of zinc 2 grams, tale 2 grams, glycerine 4 grams, rose-water 200 grams.

Mimi.—A well-known cosmetic. Match with 90 per cent. of chalk, 10 per cent. of starch, and perfume with musk and vanilla.

Nail Varnish.—Tincture of benzoin is commonly used (simple, not compound).

Oleaginous Face Cream.—Lanoline 250 grams, lard 250 grams, glycerine 1183 c.c., rose-water 355 c.c., oil of geranium 15 c.c., sufficient fatty oil to make a soft paste. Mix the fats and add the glycerine and rose-water and finally the oil of geranium.

Parisian Soap Powder.—Eight grams of powdered soap, 16 grams of farina (horse chestnut, preferably), 1 gram of caustic potash, and 2 grams of orris powder. Perfume with equal parts of lavender and bergamot.

Peroxide of Hydrogen Cream.—According to Kühl, this is best prepared by beating hydrogen peroxide solution into lanoline, and perfuming to taste. Or a cold cream basis may be used, in which no boric acid is used, but a solution of hydrogen peroxide incorporated.

Perspiration Remedy.—Fifty grams of lavender water, 50 grams of peppermint water, 50 grams of tincture of myrrh, 50 grams of tincture of quillaia, 20 grams of benzoate of soda. Apply three times a day by means of a towel soaked in water and wrung out and then sprinkled with a little of the remedy.

Rice Powders are composed of rice starch with tale in various proportions. Wheat starch and cornflour are often substituted.

Theatrical Rouge Powder.—Usually starch, tale, etc., coloured with Rose Bengal or carmine.

Skin Lotion, "Eau de beauté."—Glycerine 250 grams; rose-water 7.5 grams, elder-flower water 7.5 grams, orange-flower water 7.5 grams, eau de Cologne 30 grams, tincture of benzoin 7.5 grams, water 500 c.c. Shake during eight to fifteen days, and alter.

Violet Talcum Powder.—From 125 to 250 grams of powdered orris and 2250 grams of fine talc, perfumed with a little ionone.

Wart Cure.—According to Daniel, the best way to get rid of warts is by means of a 40 per cent. formaldehyde solution (formalin). Apply every day to the wart with a small piece of wood, rubbing well. In a few days the wart will shrivel up and drop off without leaving a wound.

SOAPS, UNGUENTS AND DISINFECTANTS

Anthrasol.—Match with purified tar oil, rectified and colourless, and rectified oil of cade.

Boroglycerine.—Match with 24 grams of glycerine, 1 gram of boric acid, 5 grams of anhydrous lanoline, 10 grams of water, 70 grams of white petroleum, 2 drops of otto of rose and 2 drops of bergamot.

Chieline is a vegetable cream (paste or solid) for treatment of scurf and dandruff. Match with 5 grams of zinc oxide, 5 grams of talc, 30 grams of powdered soap, 4 grams of lanoline, 5 grams of tincture of benzoin, 46 grams of water, and 5 grams of glycerine. Solid chieline is used in place of medicinal soap. It is matched by a soap of the following composition: water 8.6 per cent., fatty acids 62.24 per cent., glycerine 4.66 per cent., medicated, and containing about 14 per cent. of carbonate of soda.

Empyroform.—This is said to be a condensation product of formaldehyde and tar, and is recommended for the removal of freckles.

Erudol is an ointment recommended for massage treatment. It is easy to remove by washing. It is said to contain ichthyol, soft soap and sedative drugs.

Formalin Cream.—Twenty parts of lanoline, 10 parts of ozonised liquid paraffin, 120 parts of water, and 5 per cent. of formalin.

Formalin Soap.—Liquid soap containing 10 per cent. of formalin. Used as a disinfectant in surgery and in domestic practice. It is useful to deodorise linen in the laundry.

Iodised Soaps.—To avoid the disadvantage of free iodine, iodised soaps are used as substitutes. They do not stain the skin, or if stray solutions cause a stain, it is easily removed by ordinary soap. (1) Iodine 15 grams, oleic acid 15 grams, alcohol 10 grams, strong ammonia 4 grams. This gives a soap paste soluble in most solvents except oils. (2) A soap soluble in oils is obtained with 30 grams of iodine, 60 grams of oleic acid, 10 grams of ammonia, and paraffin oil to 600 c.c. (3) Glycero-iodised soap; iodine 30 grams, alcohol 130 grams, oleate of ammonia 30 grams, glycerine to 300 c.c. Oleate of ammonia is obtained by mixing oleic acid and ammonia in alcohol.

Lavoderma.—A soap compound said to contain about 30 per cent. of mercury-calcium. It is used in parasitic affections of the skin.

Liquid Medicinal Soap (Wilbat).—This is prepared in the cold as follows. Cotton oil 200 grams, 91 per cent. alcohol 300 grams, water 325 grams, caustic soda 45 grams, potassium carbonate 10 grams, ether 15 grams, phenol 25 grams. The oil, 200 grams of the alcohol, and caustic soda are placed in a bottle and when saponification in the cold is complete, the remainder of the alcohol and the carbonate of potash dissolved in the water are added. The phenol and ether are then added and the whole well shaken. It should be kept in a cool place in well-stoppered bottles. Phenol may be replaced by other medicaments.

Liquid Naphthol Soap (Terrier).—Liquid soap 10 grams, soft soap 10 grams; dissolve these in 500 c.c. of water, add 10 grams of olive oil and shake frequently for several days. Add 2.5 grams of naphthol, and perfume with lemon oil.

Liquid Glycerine Soap.—Dissolve 11 grams of caustic potash in 30 grams of alcohol, add 60 grams of nut oil and leave the mixture at 30° until saponification is complete. The soap formed is dissolved in an equal weight of glycerine.

Lysopate.—This is a mixture of 10 per cent. of lysol with neutral soap, of such consistency that it can be squeezed from metal tubes. It is easily miscible with water to a slightly opalescent solution and the lysol retains its full efficiency. *Rhenopate* is the corresponding preparation of carbolic acid, but contains 50 per cent. of phenol.

Marble Powder Soap.—According to Dr. Schleich, this is prepared as follows: dissolve 750 grams of newly-made resin soap, cut up very small, in 1500 grams of distilled water at water-bath temperature, and stir continually. When boiling add

slowly 150 grams of stearine, and then 150 grams of wax; add to the mass 7000 grams of finely sifted marble powder, and then add 300 c.c. of water to replace that which has evaporated. The mass should attain a syrupy consistency almost as thick as honey. The heating should be continued for at least an hour and a half to ensure complete sterilisation.

Mellinger's Depildatory Soap.—Saponify 453 grams of glycerine, 907 grams of solid fat, 907 grams of coconut oil and 1844 grams of castor oil with 1814 grams of 33 per cent. caustic wash. Add to this soap 113 grams of amidon and 907 grams of sodium sulphite. Perfume with 113 grams of citronella oil.

Nicotine Soap.—This is a dark brown soap, weakly perfumed with bergamot. It is composed of 5 per cent. tobacco extract (equals about 0.4 of nicotine per piece), 5 per cent. sulphur, and 90 per cent. soap paste. According to Dr. Mareuse and Dr. Täuzer this soap gives excellent results in the treatment of itch and similar maladies.

Ozonoform.—A disinfectant for the sick room, resembling sanitas. It is an ozonised pine or turpentine product.

Pâte cicale de Schleich.—Melt in a water-bath 100 grams of pure yellow wax, adding drop by drop 8 grams of 10 per cent. ammonia and then 150 grams of sterilised water while stirring continually, until the mass has the appearance of cholesterol. The emulsion should be perfectly homogeneous and should have a neutral reaction. This is obtained by adding melted wax or ammonia as necessary. The water can equally well be made alkaline by adding sodium carbonate (5 c.c. of centinormal Na_2CO_3).

Pâte cicale de Schleich.—Melt in a water-bath 100 grams of stearine, adding drop by drop 10 grams of 10 per cent. ammonia. Remove from the water-bath and add drop by drop 100 grams of water made alkaline with 100 grams of Na_2CO_3 . Stir until the mass attains the consistency of a paste; then add more ammonia to obtain a product soluble in water. Finally add 50 grams of water.

Peroul Soap.—This is used to prevent contagion with itch, and to cure this malady in its last phase contains 10 per cent. of benzylbenzoic ether which corresponds to 1 per cent. peroul.

Peroxols.—These are products based on peroxide of hydrogen, to which are added various disinfectants, such as salicylic and carbolic acids, naphthol, thymol, camphor, menthol, etc. They

are colourless liquids miscible with water. A 3 per cent. solution of peroxide, containing traces of phosphoric acid to preserve it, is used; and the other medicament is added in the proportion of 1 to 2 per cent. The finished product contains 33 per cent. of alcohol. From 5 to 10 per cent. solutions are used for disinfectant purposes.

Phentozone.—An antiseptic recommended for colds in the head. Match with 52 parts of acetic acid, 2 parts of menthol, 2 parts of phenol, 2 parts of camphor, 2 parts of eucalyptus oil and 2 parts of lavender oil.

Puroform.—Antiseptic and disinfectant composed mainly of zinc salts, aldehyde, thymol, menthol, and eucalyptol. It is an excellent non-irritating germicide.

Säuger's Sand Soap.—This is made, according to Dr. Schlenk, by drying at 100° and sifting rough sand to obtain equal-sized grains. Seven or 8 parts of this sand are added to 1 part of soap solution prepared as follows: a soda soap is dissolved in water and boiled until the soap begins to precipitate again, then a little ammonia is added. After cooling, the ammonia which has volatilised is replaced.

Sapodermine.—A medicinal soap, non-irritating and used in dermatological practice. The medicament is mercury-casein containing 6.0 per cent. of mercury. The soap itself contains 0.2 to 1 per cent. of mercury.

Soapform.—A formaldehyde soap, recommended as a disinfectant. Mix 110 c.c. of oleic acid with 60 c.c. of alcohol; add 20 grams of caustic potash in 60 c.c. of water. Allow to stand for twelve to twenty-four hours and add 260 c.c. of formalin. The product is miscible in water and can be used in a 2 to 3 per cent. solution instead of carbolic acid or corrosive sublimate solutions.

Sapomenthol.—Ointment used for gout, rheumatism, and similar affections. It is rubbed in two or three times a day on the parts affected, which are then wrapped round with flannel. It is a mixture of soap, menthol, ammonia, camphor, alcohol, and essential oils.

Soap to Prevent the Hair Falling Out.—This is a liquid soap paste, with the addition of extracts of nettle root, quinquenna, parsley, glycerine, and borax. It gives good results in the treatment of seborrhoea.

Dr. Unna's Sodium Peroxide Soap.—For removing freckles, etc. Dr. Töllner's formula is as follows: 30 parts of liquid

paraffin and 70 parts of medicinal soap are thoroughly mixed with 2·20 parts of hydrogen peroxide. It is best applied at night before retiring; in severe cases it may be applied three times a day in the following manner. The paste is lathered on the face with a piece of damp wadding until it begins to sting, when it is quickly removed by washing.

APPENDIX

FRUIT ETHERS

This name is given to the various ethers diluted with alcohol imitating more or less the aromas of various fruits. They are used in making liqueurs and especially jams. The principal ingredients of these products are : ethylnitrate, ethylacetate, ethylbutyrate, ethylbenzoate, amylnitrate, amylacetate, ethylamylvalerianate, ethylamylecaprinatate, ethylamylbenzoate, ethylamylsalicylate.

The formulæ for the principal fruit ethers are as follows :—

(1) *Pinapple Ether* : Ethylbutyrate 25 grams, ethylamylvalerianate 135 grams, chloroform 5 grams, aldehyde 5 grams, alcohol 830 grams.

(2) *Apple Ether* : Ethylnitrate 50 grams, ethylacetate 50 grams, ethylamylvalerianate 100 grams, glycerine 40 grams, aldehyde 7.5 grams, chloroform 7.5 grams, alcohol 745 grams.

(3) *Apricot Ether* : Benzoic aldehyde 35 grams, ethylamylbutyrate 190 grams, chloroform 10 grams, alcohol 765 grams.

(4) *Pear Ether* : Amylacetate 200 grams, ethylacetate 50 grams, ethylnitrate 100 grams, glycerine 20 grams, alcohol 630 grams.

(5) *Strawberry Ether* : Amylacetate 27 grams, ethylamylvalerianate 18 grams, ethylamylbutyrate 9 grams, ethylamylformate 9 grams, ethylacetate 15 grams, violet oil 7 grams, alcohol 915 grams.

(6) *Raspberry Ether* : Pear ether 60 grams, chloroform 15 grams, ethylacetate 9 grams, rose oil 6 drops, oil of lemon 2 drops, oil of sweet orange 2 drops, tincture of violet 100 grams, tincture of raspberry 600 grams, alcohol 216 grams.

(7) *Cherry Ether* : Amylacetate 15 grams, ethylamylbutyrate 8 grams, benzoic aldehyde 10 grams, cinnamon oil 2 grams, oil of lemon 2 grams, oil of cloves 2 grams, oil of sweet orange 1 gram, alcohol 960 grams.

(8) *Peach Ether*: Ethylamylvalerianate 100 grams, ethyl-
amylbutyrate 100 grams, ethylacetate 20 grams, benzoic aldehyde
10 grams, alcohol 770 grams.

Several of the higher fatty aldehydes are also used in the
blending of fruit ethers. In commerce they are known under
the names strawberry aldehyde, peach aldehyde, etc.



INDEX

- ABSOLUTES, 109
- Acacia, 139, 190
 - tincture of, artificial, 116
- Acetic acid, 39
 - ether, 39
- Acetophenone, 48
- Alcohol, 3
 - absolute, 9
 - — determination of, 7
 - — purification of, 5
 - table, 10
 - testing of, 6
- Alcoholometers, 8
- Alkannin, 44
- Almond paste, 220
 - powder, 219, 220
- Alum stone, 388
- Ambergris, 33
 - infusion of, 99
 - tincture of, artificial, 115
- Ambre-Royal, 128, 140
- Ambrette, infusion of, 99
- Ambrettol, tincture of, 116
- Ambrosia, 132
- Ammonia lotion, 228
 - water, 229
- Amyl salicylate, 48, 79
- Anchusa root, 44
- Anethol, 49, 50
- Anisic aldehyde, 49, 60
- Antiseptic dentifrice, 237
- Antiseptics to prevent rancidity, 18
- Anti-shaving-rash jelly, 258
- Anti-wrinkle paste, 258
- Arnica, infusion of, 266
- Armenian paper, 328, 329
- Aromatics, 111
- Aromatic pills, 338
 - waters, 88
- Artificial flower tinctures, 113
 - lemon oil, 65
 - perfumes, table of, 85
- Aubepine, 60
- Avion, 158
- Azalia, 140, 199
- Baiser de Roxane, 159
- Balsam of Peru, infusion of, 100
 - of Tolu, infusion of, 100
- Bandolines, 290
- Barium sulphate, 38
- Bath crystals, 231
 - detergent for, 232
- Bath milk, 232
 - requisites, 231
 - salts, 231
 - softening powders, 232
- Beard fixatives, 291
- Beauty creams, 248
- Beeswax, 20, 21
- Bengal red, 44
- Benzoic acid, 60
 - aldehyde, 48, 62
- Benzoin, infusion of, 100, 275
 - spirit of, 105
- Bennet's Dentifrice, 236
- Benzyl acetate, 69
 - alcohol, 63
 - salicylate, 48
- Bergamot, 186
- Bismuth subnitrate, 37
- Bixa orellana, 44
- Bixin, 44
- Black colours, 42
- Blanc fixe, 38
- Bois de Rose, infusion of, 104
- Bottleaux red, 44
- Borneol, 63
- Borneol, *res*, 63
- Bornyl acetate, 64
- Bouquets, 122
 - de Cachemire, 160
 - de Carmen, 159
 - de France, 130, 169
 - Geisha, 165
 - Maréchale, 166
 - Mikado, 167
 - water, 198
- Bourbonal, 116
- Brilliantines, 282, 283
 - solid, 283, 284
- Brise d'Alsace, 165
 - d'Espagne, 169
 - de la Pampas, 159
- Bromacia, 75, 117
- Bromostyrolene, 48
- Broom, 111, 144, 147
- Butyl benzoate, 62
- Cachous for smokers, 246
- Camelia, 141
- Camomile lotion, 230
- Camphor, 51
- Cananga water, 200, 201, 209
- Carbol dentifrice, 241
- Caramel, 42

- Carmine, 43
 Carnation, 68, 110, 147
 Carthamus tinctoria, 42
 Carvacrol, 51
 Carvone, 51
 Cassia, 65, 141, 191
 Castor, 33, 100, 275
 Cattleya, 142
 Ceresine, 24
 Charcoal, 42
 Champaca, 191
 Chantilly, bouquet de, 134
 Chêne Royal, 140
 Cherry blossom, 142, 149
 Chlorophyll, 45
 Chrysanthemum, 142
 Chypre, 161, 187
 Cinchona, infusion of, 102
 Cineol, 52
 Cinnamic alcohol, 49, 82
 — aldehyde, 48, 81
 Cinnamon, infusion of, 100
 — oil of, 82
 — spirit of, 105
 Citral, 49, 52
 Citronellal, 49, 53
 Citronellol, 53
 Civet, 32
 — infusion of, 101, 266, 275
 — tincture of, 115
 Clamatis, 141
 Clover, 138, 141, 149, 151, 193
 Cloves, infusion of, 100
 Cochineal, 43
 Cocoa butter, 18
 Coco-nut oil, 18
 Cœur de Jeanne, 160
 Colonial bouquet, 187
 Colouring matters, 41
 Concentrated perfumes without alcohol, 189
 Concretes, 109
 Coriander, infusion of, 101
 Corylopsis, 161
 Cosmetics, 216, 265, 293
 — cleaning, 217, 233
 — fine, 287, 288, 289
 — fixative, 285
 Côte d'Azur, 161
 Coumarin, 65, 116, 266
 Cour de Russie, 162
 Cream, almond milk, 256
 — bayard, 261
 — beard, 257
 — beauty, 247
 — camphor, 253
 — cold, 250, 251, 252
 — cucumber, 252, 253
 — de Cologne, 253
 — dental, 246
 — du Cathay, 253
 — enamel, 258
 — for red hands, 250
 — glycerine, 249, 259
 — lanoline, 248, 252
 — lily, 260
 — cream noussoline, 254
 — petroleum, 248
 — shaving, 385
 — soap basis, 253
 — starch, 259
 — stearate, 254, 256, 385
 — sulphur, 250
 — vanilla, 250
 Crushing machines, 94
 Cuir de Russie, 163
 Cumic aldehyde, 54
 Cuscuta tinctoria, 42
 Cyclamen, 143, 191
 Cymene, 54
 Delices de Suzy, 166
 Dentifrice, 234
 — American, 238
 — antiseptic, 237
 — apodontol, 241
 — Beumet's, 236
 — camphor, 241
 — carbol, 241
 — cherry, 245
 — cinchona, 235, 241
 — creams, 246
 — Dr. Pierre, 236
 — elixir, 235, 236
 — hygienic, 245
 — ideal, 242
 — Meyer's, 236
 — Monin's, 237
 — Odol, 240
 — Odontalgic, 245
 — Odontine, 245
 — oxygenated, 238
 — pastes, 242, 245
 — peppermint, 238
 — powders, 240, 241
 — quinosol, 237, 242
 — rose, 242
 — salol, 238, 242, 245
 — soaps, 242, 243, 244
 — stomatol, 240
 — thymol, 237, 244
 — Vigier's, 237
 Depilatories, 312
 — alkaline, 314
 — arsenious, 313
 — sodium sulphide, 312
 — thallium, 315
 Determination of alcohol, 7
 Diadermine, 256
 Digestion, 91
 Eau de Bayadères, 202
 — Boileau, 228
 — Cologne, 202
 — Espagne, 201
 Eau divine, 201, 209
 Églantine, 147
 Enamel, white, 37, 297
 Essence, 43, 44
 Ess-Bouquet, 163, 180, 182
 Essence of Soap, 387
 Ethyl benzoate, 62

- Ethyl cinnamate, 83
 — salicylate, 79
 Eugenol, 48, 54
 — iso, 68
 Euresol, 230
 Evening breeze, 170
 Export, extracts for, 186
 Extract of fern, 143
 — of honey, 166, 179
 — of violets, 127, 131, 135, 137,
 170-175, 177, 178-182, 183, 198
 Extracts, double, 131, 177
 — No. 3, 135
 — No. 4, 137
 — quadruple, 139
 — simple, 99
 — triple, 126, 139
 Farina meals, 300
 Fatty bodies, 9
 — liquid, 14
 — refining of, 11
 — solid and semi-solid, 17
 Felsina water, 201
 Fenchone, 54
 Fern, extract of, 143
 Fine cosmetics, 287, 288, 289
 Filter papers, old, use of, 21
 Filtration, 117
 Fixatives, 123, 265, 267, 268, 269, 270,
 271, 285, 290, 291
 Floating soaps, 388
 Florida water, 199, 200, 208
 Flower tinctures, artificial, 113
 Flowers of Africa, 189
 — of India, 189
 — of spring, 135
 Frangipani, 164
 Frankincense, 101
 Freckle remedies, 262, 263
 Fruit ethers, 413
 Fuchsine, 44
 Fumigating pastilles, 326, 327, 328
 Fumigators, 323
 Furfuol, 55
 Fustic, 42
 Gardenia, 144, 188, 191
 Geraniol, 49, 55
 G. ranaum, 146
 Geranyl acetate, 66
 Glove perfumes, 338
 Green colours, 45
 Glycerine, 60, 261
 — and Honey Jelly, 257
 Glycene, 191
 Hamatin, 44
 Hair curling fluid, 202
 — dyes, 301, 310
 — fixatives, 290
 — restorer, 227, 272
 Handkerchief perfumes, 122
 Hawthorne, 136, 149
 Headache cures, 322
 Heliotrope, 129, 134, 136, 178, 181, 185,
 187, 191, 197, 198, 208
 Heliotropin, 66, 116, 147, 148, 266, 276
 Hermosura water, 303
 Honey, extract of, 166, 179
 — water, 137
 Honeysuckle, 191
 Hungarian pomade, 286
 Hyacinth, 67, 148, 180, 181, 191, 208
 Hyaline blocks, 388
 Hydrocarbons, liquid, 22
 Ideal perfume, 158, 160
 Incense, 323
 — grains, 325
 — vinegar, 325
 Indigo, 41, 45
 Indol, 49
 Infusion, 91
 — with fat, 275
 — with oil, 266
 Ionone, 49, 70, 112
 Ironic, 57
 Ixora, 149
 Japanese lily, 176
 Jasmim, 9, 19, 69, 107, 116, 126, 131,
 135, 137, 144, 145, 181, 191
 Jasmine, 57
 Javan bouquet, 188
 Jellies, 257
 — glycerin and honey, 257
 Jockey Club, 129, 133, 137, 164
 Jonquil, 107, 144, 191
 Kadsura, 165
 Ki-Loc, 176
 Lanoline, 19
 Lanoline cream, 248, 252
 Lard, 17
 Lavender, infusion of, 101
 — water, 194, 195, 202, 203
 Lead carbonate, 37
 Lemon oil (artificial), 65
 — spirit of, 105
 Liquid fatty bodies, 14
 — soaps, 218, 382
 — hydrocarbons, 22
 Lilac, 145, 146, 178, 181, 185, 186, 207
 Lily of the Valley, 151, 178, 182, 186,
 192
 Lime flowers, 151, 152
 Linalol, 49, 57
 Linalyl acetate, 73
 Lip salve, 289
 Lubin Type toilet water, 195, 196
 Macassar oil, 271
 Macerations, 91
 Magnolia, 130, 137, 149
 Malachite green, 45
 Malmaison, 152
 Mandarin oil, 73
 Maréchal Niel Rose, 150
 Medicated soaps, 384
 Mechanical agitator, 108
 Menthol, 58

- Methyl anthranilate, 49, 84
 — benzoate, 61
 — cinnamate, 83
 — methylanthranilate, 84
 — salicylate, 48, 78
 Mignonette, 107
 Milks, toilet, 261, 262
 of almonds, 262
 Lait virginal, 261
 Lilac virginal, 261
 of Roses, 262
 Mille-fleurs, 167, 182
 Mimosa, 149, 192
 — water, 203
 Mineral oil (artificial), 271
 — wax, 24
 Moscar, essence of, 176
 Moss rose, 155
 Mousse de chêne, infusion of, 102
 — — tincture of, 116
 Mousseline, 129, 133, 136, 186
 Muguet, 152
 Musk, 28, 48, 73, 102, 103, 113, 128,
 138, 167, 180, 184, 266
 Myrrh, infusion of, 103

 Nail preparation, 263, 264
 — polish, 264
 Naphthol ethers, 49
 Narcissus, 153, 192
 • Nasturtium, infusion of, 108
 Nerol, 56
 Neroline, 5
 Neroli oil, artificial, 76
 — — tincture of, 117, 192
 Nettle lotion, 230
 New mown hay, 128, 143, 180, 183, 197
 — — lotion, 229
 Niobe oil, 61
 Nitrobenzene, 77

 Oak moss, infusion of, 102
 Oil, almond, 15
 — ben, 15
 — castor, 16
 — of cinnamon, 82
 — macassar, 271
 — mineral, 22
 — neatsfoot, 16
 — olive, 14
 — peach-kernel, 15
 — sesame, 15
 Oils, essential, 25
 — — terpenaceous, 26
 Oleander, 153
 Opoponax, 103, 168, 179, 182, 184
 Orange, 154, 192
 — flower water, 90
 — infusion of, 107
 — lotion, 225, 226
 — spirit of, 106
 — water, 201
 Orchid, 78, 188
 Orchil, 44
 Orris, 101, 110, 192, 276
 Ozokerite, 24

 Pansy, 153
 Papers, perfumed, 339
 Paraffin, 23
 Pastes, cleaning, 4
 Pastilles, fumigating, 326, 327, 328
 Patchouli, 102, 110, 127, 133, 136, 153,
 180, 184, 185, 188, 192, 207
 Peau d'Espagne, 162, 304
 Peony, 154
 Pepper, 104
 Perfumed spirits, 91
 Perfumes, synthetic, 46, 87, 139
 — — table of, 85
 — — tinctures of, 111
 Petrol lotion, 227
 — — perfumed, 228
 Phenol, 39
 Phenyl-ethyl alcohol, 48
 Pimento, infusion of, 104
 Pomades, 272, 276
 — — bases for, 273, 275, 276
 — — colourings for, 273
 — — infusions, 272, 276
 — — mixer for, 273
 Portugal, spirit of, 106
 Powders, toilet, 293-296
 Prussian blue, 41
 Pulegone, 58
 Pumice soaps, 388

 Quadruple extracts, 139
 Quinine dye, 225
 — — lotion, 224, 225
 Quinocol lotion, 224

 Red colours, 43
 — — sanderswood, 43
 Refining of fatty bodies, 11
 Remembrance, 177
 Resinoids, 110
 Rhodinol, 49, 53
 Rhus cotinus, 42
 Rice powders, 293
 Rocella tinctoria, 44
 Rondeletia, 169
 Room perfumes, 329, 330
 Rose, 77, 106, 110, 116, 127, 131, 135,
 137, 154, 156, 179, 185, 186, 190, 192,
 198
 — — water, 89, 195
 Rosiris, 155
 Rouges, 293, 297, 298, 299
 Russian leather, 337
 Rustic flowers, 167

 Sachet powders, 331-336
 Saffron, 46
 Saffron, 175
 Safron, 49, 58
 — — iso, 69
 Salicylic aldehyde, 79
 Sandalwood, 102, 110, 133, 156, 192
 Santalol, 59
 • Scalp massage preparations, 223
 Shampoos, 220
 Shaving cream, 385

- Shaving preparations, 384-388
 Silver nitrate, 38; *see also* "Hair dyes."
 Simple extracts, 99
 Skin lotion, 224, 227, 229
 Smelling salts, 317, 319, 320, 321
 Smokers, cachous for, 246
 Soaps, essence of, 387
 — floating, 388
 — in tubes, 383
 — liquid, 218, 382
 — lotion, 229
 — medicated, 384
 — perfumes, 346
 — pumice, 388
 — shaving, 384, 386
 — synthetic perfumes for, 351
 — toilet, 345
 Solid brilliants, 283, 284
 Specialities and secret preparations, 390
 Spermaceti, 21
 Spirit of cinnamon, 105
 Spirit of orange, 106
 Spring flowers, 170
 Starch, 40, 293
 — cream, 259
 Steatite, 37
 Stephanotis, 156
 Storax, 100, 266, 276
 Styrol, 59
 Suet, 18
 Sulphur cream, 250
 Sumbul, 102
 Sweet pea, 130, 132, 162
 Syringa, 157, 193, 204, 226
 Table of artificial perfumes, 85
 Tablets, aromatic, 342
 Tale, 37
 Tatto marks, product to remove, 262
 Tea-rose, 155
 Turpeneol, 79
 Thymol, 59
 Tinctures, 93
 Toilet vinegar, 316, 317, 318
 — waters, 194
 Tonquin beans, infusion of, 104, 276
 Trèfle incarnat, 150
 Triple extracts, 128, 139
 Tuberosa, 107, 157, 193
 Turanol, tincture of, 116
 Turmeric, 42
 Vanilla, 34, 103, 116, 129, 157, 191
 — 260, 276
 — cream, 250
 Vanillin, 48
 Vanillins, 36
 — infusion, 104, 276
 Verbena, 127, 133, 136, 157, 197, 202, 226
 Vetivert, 104, 110, 111, 157, 336
 Vice-Reine, 163
 Victoria bouquet, 128
 Vine flowers, 158
 Vinegar pencils, 322
 — sabs, 321
 — toilet, 316, 317, 318
 Violet colours, 45
 Violets, extract of, 127, 131, 135, 137, 170-175, 177, 178-182, 183, 198
 — infusion of, 108
 — leaves, artificial, tincture of, 117
 — lotion, 226, 227
 — perfume, 112, 193
 — tincture of, artificial, 117
 — water, 197, 204
 Water, 1
 — distillation of, 2
 — filtration of, 2
 Waters, perfumed, 122
 Wax, mineral, 24
 — white, 20
 — yellow, 20
 West End bouquet, 188
 White lilac, 145, 146
 Xour lotion, 228
 Xylopi, 176
 Yara-Yara, 75
 — tincture of, 117
 Yeddo bouquet, 189
 Yellow wax, 20
 Ylang-ylang, 81, 158, 181, 183, 184, 193, 196
 Zinc oxide, 38

